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AUTOTYPE

THE AUTOTYPE MANUAL

OF

Permanent Photography

(POPULAR EDITION):

BEING A

PRACTICAL HANDBOOK

TO THE

Production of Photographs

IN

PERMANENT COLOUR.

ONE SHILLING.

THE AUTOTYPE COMPANY,

~~36 RATHBONE PLACE,~~

LONDON, W.

1074 New Oxford St.

London: W.

THE
ART OF
PHOTOGRAPHY
BY
J. M. W. TAYLOR
A GUIDE
TO THE
PRACTICE OF THE ART
OF PHOTOGRAPHY
IN
THE
PRACTICE OF THE ART
OF PHOTOGRAPHY
ONE SHILLING

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THE
AUTOTYPE PROCESS:

BEING

A Popular Manual of Instruction

IN THE ART OF

PRINTING IN PERMANENT PIGMENTS.

By J. R. SAWYER.



AUTOTYPE COMPANY, 36 RATHBONE PLACE, LONDON,

1877.

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AUTOTYPE PROCESS

A Popular Journal of Education

IN THE ART OF

PRINTING IN PERMANENT FIGMENTS.

BY J. M. SAWYER



PREFACE TO THE POPULAR EDITION OF THE AUTOTYPE MANUAL.

It is anticipated by many, that the lapse of Mr. Swan's Patent for the manufacture of Carbon Tissue will, by throwing open the ground for all who may choose to occupy it as tissue makers, very widely extend the practice of permanent printing, and that by the special effort which competition always calls forth, many useful modifications and improvements will be suggested. The present proprietors of the Autotype Company sincerely desire that these anticipations may be realized; in order to place whatever information they possess in a cheap and easily accessible form before all who are interested, they have decided to publish this *popular* edition of their Manual, which in its old form has exhausted its sixth edition.

As the lapse of Mr. Swan's patent somewhat alters the position of the Autotype Company with respect to their licensees, it has been considered advisable to indicate in a short Appendix to this Manual, the actual position of the Company with reference to their existing patents.

What the present proprietors of the Autotype Company have most at heart is, to extend the system of producing photographs in a *permanent* form; to augment the resources of the profession by the introduction of enlargements and reproductions from negatives already in existence; to popularize genuine works of art by disseminating copies of them throughout the length and breadth of the land; and to remove from the beautiful and popular art of photography the stigma of want of permanency in its results.

In preparing this popular edition of the Manual, the Editor has had the advantage of comparing notes with some of the best and most successful workers, and their assistance combined with his own practical experience will, he hopes, enable this little book to become a thoroughly practical hand-book of Photographic Printing in Permanent Pigments.

J. R. SAWYER.

May, 1878.



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THE AUTOTYPE PROCESS.

Part I.

ITS NATURE AND HISTORY.

INTRODUCTION.

THE term AUTOTYPE has been proposed, and has been very generally accepted as appropriate, to signify the reproduction of an artist's work in Monochrome, without the intervention of another hand or eye: the only means used being the natural forces of LIGHT or ACTINISM, and CHEMICAL AFFINITY; and the material employed being any of the PERMANENT PIGMENTS of the artist's palette.

The term has been further extended to mean generally, the production of a photographic picture in a permanent pigment, such as those used by artists in oil or water-colour, crayon or pencil.

Many persons have contributed to render this possible. Ponton, the elder Becquerel, Poitevin, Burnet, Blair, Fargier, &c., &c., have each added their quota to the general stock of knowledge upon this subject. It was not, however, until Mr. Joseph Wilson Swan, of Newcastle, had patented his improvements, that pigment printing became commercially practicable, and even then the nature of the process was such as to require a specially constructed factory and skilled operators, to be successful; so that amateurs, and, indeed, photographers in general, were deterred from engaging in its practice, notwithstanding the value of the results. These were admitted to

be very nearly equal to those produced by the ordinary silver process, when the pigment used was made to imitate the silver tints ; and undoubtedly *superior* to that process, as regarded the variety of colours attainable, and their absolute stability.

The difficulties attending the practice of Swan's process, such as the use of the copper-plate press, of the india-rubber paper, &c., were removed by the system introduced by Mr. J. R. Johnson, a Director of the AUTOTYPE COMPANY, which was formed to work and develop commercially the system of Carbon Printing, now called the "Autotype Process." By his mode of operating, patented February 3rd, 1869, Autotype pictures were produced with facility. Since that time successive improvements have been suggested and worked out practically, and it is not too much to say, that at the date of the publication of this popular edition of the *Autotype Manual*, photographs in permanent pigments are produced which are superior in quality to prints in silver, and in a range of permanent colour, satisfying almost every condition of the art.

HISTORY OF THE PROCESS.

The *rationale* or general principles of the new process will be best understood after we have given a short narrative of the various attempts by previous inventors, to produce carbon or pigment pictures.

We must premise that the basis of all the processes to which we shall have to refer, is the peculiar action which light has upon the bichromates ; and particularly upon the bichromates of potass and ammonia, when they are exposed to the actinic rays of light, in contact with organic matter.

MUNGO PONTON first observed this action, when or while exposing to light, paper which had been immersed in a solution of the bichromate of potass.

BECQUEREL showed that sized paper acted much more rapidly under such action than that which was unsized—hence the association of gelatine or gum, or their analogues, with the bichromates in such experiments.

POITEVIN found that if a pigment were mixed with the compound of gelatine and bichromate and then exposed to the action of light, the pigment became developed in that portion of the gelatine thereby

rendered insoluble, and that it could not be removed by washing in water—by availing himself of this property, he succeeded in obtaining the *first* photograph in pigment. Paper, coated with a thin layer of a mixture of albumen or gelatine, bichromate, and pigment, was exposed to light under a negative. The albumen or gelatine, became insoluble where the light impinged upon it; while that unacted upon, retaining its original solubility, was washed and “sponged” away from the surface of the paper, leaving the pigment fixed, or entangled in the insoluble gelatine, to constitute the picture. When the coating of pigment compound is of extreme tenuity, pictures in line or stipple may be thus produced, but not pictures in gradation or half-tone. When the pigment coating is of the thickness used in the modern processes, no picture can be produced upon the paper supporting it, for reasons that will be explained later.

POITEVIN also made another very important discovery in connexion with this subject, viz., that the surface of gelatine rendered insoluble by light, acquired the property of repelling water, as from a greasy surface, thus enabling a design to be inked with printer’s ink, and an impression to be taken from the inked surface on to paper—a property which has led to surprising results in the direction of the Mechanical Printing of photographs.

SUTTON saw the value of the new principle laid down, but not worked out, in Poitevin’s patent, and made several suggestions for its application.

POUNCY repeated these experiments after the date of Poitevin’s patent, using gum arabic instead of albumen, and a porous paper, *into* which he brushed the soluble pigmented compound; producing thereby the first carbon prints in half-tone. He commenced a patent but failed to complete it, and thus abandoned his process to the public. It can hardly, however, be said to have formed a link in the chain of inventions, by which success has been achieved.

It was the Abbé de Laborde in France, and BURNET and BLAIR in England, who explained the reason of Poitevin and Pouncy’s imperfect results. They showed us that the sensitive compound became insoluble on the *surface* exposed to the light, and that the parts partially acted upon, and constituting the half-tones of the picture, rested upon a *substratum* of the compound, entirely unacted upon, and therefore soluble; and that to obtain these half-tones, the soluble

substratum should be removed, by attacking it from the opposite side. To effect this, they spread the sensitive compound upon glass, or paper made transparent, and printed the picture from behind, that is through the transparent material. After exposure, they washed away the soluble compound unacted upon, leaving the insoluble picture attached to, or *supported* by, the glass or paper. The importance of the reasoning, and of the experiments to which it led cannot be exaggerated, and to these gentlemen, and particularly to the persistent efforts of Mr. Blair, we owe much of our success in pigment printing.

FARGIER spread the gelatine pigment compound upon glass or other plane surface, exposed the sensitive surface itself directly under a negative, covered that surface with a layer of collodion, and then immersed the plate supporting it in warm water. On the soluble gelatine being removed by washing, the collodion film floated and acted as a *support* to the insoluble film attached to it. The picture had then to be caught by inserting a piece of paper under it.

He also made a paper to be printed upon from behind and through its substance, which must therefore have been of great tenuity and delicacy of texture, or must have been rendered transparent by oil or varnish. To produce correct pictures by this latter process the negatives must be inverted.

SWAN greatly improved upon Fargier. He spread the sensitive compound upon glass, previously coated with collodion, separating the compound film which he called a "tissue." This he exposed under the negative, and after exposure, mounted it on a support *before* developement, thus avoiding the practical difficulties of Fargier.

He showed that the support might be either *permanent or temporary*. In the former case, the exposed tissue was at once fixed to the paper, card, or other surface upon which it had to remain. This he effected by means of albumen rendered insoluble by alcohol, or by heat, so as to be unaffected by the subsequent washings. Several other experimenters adopted a somewhat similar mode of working about the same time.

In the latter case, in which a temporary support was used, the exposed tissue was mounted, by being coated with a solution of india-rubber, and was then attached, by heavy pressure, to a piece of paper coated with the same substance. In both cases the mounted tissue was *developed*, by being washed in warm water to remove the soluble gelatine unacted upon by light; and, subsequently, in cold water to

remove the last traces of the chrome salts remaining within the substance of the picture film.

Pictures produced by the first method, on the *permanent* support require no further treatment; but such pictures, if taken from ordinary negatives, are unfortunately reversed, and this, of course, was a drawback to the usefulness of the process. Mr. Swan paid, therefore, but little attention to this part of his patent, directing his labour exclusively to the second form of it, that in which the tissue is mounted upon a *temporary* support. He corrected the inverted picture upon such support, by transferring it from its temporary to a permanent support formed of paper coated with gelatine, and subsequently treated with alum. The india-rubber paper which had served as a temporary support was then removed by moistening it with benzine, and stripping it from the face of the inverted print.

Mr. Swan made an important modification in the preparation of his "tissue" in the six months allowed him by law for completing his invention, and for describing the means by which he carried it into practice. He found that if the compound layer of pigmented gelatine and collodion was also "supported" by paper before development, greater facilities of manipulation were insured, and that in this case the intermediate support of collodion could be dispensed with. He further modified the composition of the sensitive compound by the introduction of sugar in specified quantities, and also defined the thickness of the layer of pigment compound to be spread upon the paper, &c.

Since the invention of Mr. Swan's process, and which has been worked so admirably and successfully by Braun, of Dornach, whose reproductions of original drawings by the old masters are well known, many attempts have been made to simplify and improve the process of Swan. Processes have been published by Messrs. Jeanrenaud, Despacquis, and Edwards; but these are all either identical with, or are mere modifications of Swan's single transfer process, in which albumen, coagulated by heat or alcohol, is the cement used to fix the picture to its permanent support. Jeanrenaud using literally albumen and spirit; Despacquis milk, that is caseine; and Edwards gelatine rendered partially insoluble by alum; the use of which, for fixing carbon prints to their final support in the second transfer, had been already published by Swan, in the *Year-Book of Photography* for 1867.

All these processes, however, require for their practice the use of

inverted negatives, and cannot be applied to many of those already existing, which are usually non-inverted; unless these latter be lifted from their glass support and transferred to another; a process difficult to accomplish except in very experienced hands.

GENERAL PRINCIPLES OF THE NEW AUTOTYPE PROCESS.

Having described the state of our knowledge of the carbon process at the end of the year 1868, we will now set forth in general terms the new principles discovered by Mr. J. R. Johnson. He found, that in order to fix a pigment print upon its permanent or temporary support, no cement is necessary, provided that the support be impervious to air and water; that if instead of substituting one cement for another, we discard all cements, and simply lay the wetted tissue upon such support, removing the air and excess of water from between the surfaces, the insoluble, or partially insoluble surface of the tissue adheres to the support exactly as the boy's leather lifter, or sucker adheres to the stone to which he has applied it. All that we have to do to complete the picture is to wash it in warm water, and after the soluble gelatine is removed, to immerse it in cold water. If transparent glass be used as the support, the picture is complete as a transparency; or as a picture to be viewed by reflected light when backed with paper. If the support be opaque, as opal glass, ivory, prepared canvas, india-rubber paper, &c., the result is the same, but the picture is inverted, if the ordinary negatives have been employed.

There is, however, no difficulty in correcting this inversion by a very easy process of transfer. If the glass, or other support employed be coated with a fatty or resinous body, infusible at the temperature of the water used for developing the print, the picture film may readily be detached from the temporary support, on being mounted upon a piece of paper by one of the many colloid bodies which may be used for this purpose.

THE AUTOTYPE PROCESS, with the advantage of these improvements, consisted therefore of the following operations:—

1. Sensitizing the pigment paper, and hanging it to dry in a room heated to 70 or 80° Fahr.
2. Exposure of the sensitive paper under a negative.
3. Mounting the exposed pigment paper by means of cold water only, upon a waxed plate, or a sheet of paper made impervious;

developement and drying; the picture is then complete if from a reversed negative—or in the case of a non-inverted negative—

4. Transfer of the developed print to its final resting place, by simply immersing the transfer paper in hot water, and applying it to the surface of the picture while still upon the temporary support. When dry, the picture spontaneously falls off the supporting plate, firmly attached to the enamelled paper; leaving the plate clear for the operations to be repeated.

In October, 1874, Mr. Sawyer introduced and patented his "Flexible Temporary Support," which by permitting the developement of the picture on a soft couche or film of an insoluble colloid body secures perfect adhesion during developement, whilst the wonderful ease and certainty with which the operations are performed, renders it commercially practicable to the professional photographer. Full instructions for working, and description of the very simple plant required, will be found in another chapter.

Finally the Autotype picture is ABSOLUTELY PERMANENT. Unlike the ordinary photographs produced in silver, which ultimately become yellow, and nearly disappear under the action of the sulphur present in our smoky atmosphere, or the compounds left in the prints themselves in the form of hyposulphites, the Autotype is as durable as the pigment employed in its production. If this be *permanent*, so is the print, for it owes its colour entirely to this inert pigment in its unchanged condition. We say, inert, for it is the medium, or vehicle, employed with it which is the agent in the chemical changes involved, and *not* the pigment. The basis of this medium is gelatine, a substance, universally recognized as a legitimate agent, and employed extensively, by the Old Masters, in distemper, or tempera-painting notwithstanding its solubility in water, and its liability to become affected by damp and moisture. But the substance of the Autotype picture is not subject to this defect. The vehicle is not *soluble* gelatine but gelatine *combined with an earthy basis*, and therefore *insoluble* even in hot water: this substance is also the substratum used for the transfer of the finished print. It has been called with great propriety, transparent leather; * that is to say, it is of the nature of parchment or vellum, a material universally used for muniments, title deeds, and

* See the admirable letter of Dr. George Markham, on this subject, in the *British Journal of Photography*, February 25th, 1870, p. 84.

other important documents. Our ancient illuminated manuscripts prove, by the centuries which have elapsed since they left the artist's hands, that this material is, of all organic bodies, one of the most stable and permanent, when employed as a basis for coloured pigments; nor is the pigment or vehicle used in these paintings (size or gelatine) less permanent than the surface upon which they rest, the purity of the colours forming a marked contrast to those in oil paintings of a much later date; the siccative oil varnish of the latter having in oxidizing, acquired the well-known yellow hue which modifies the tint of every pigment.

THE
AUTOTYPE PROCESS.

Part II.
ITS GENERAL PRACTICE.

THE MANIPULATIONS.

THE manipulations necessary to produce an Autotype picture may be classified under four heads, viz :—

The Rendering of the Pigmented paper Sensitive to Light.

The Exposure of the same to the action of the Light under a negative.

The Developement and fixation of the latent image.

The Transfer to the final support.

These will be classified under separate headings, and the apparatus and materials necessary for each set of operations, treated of at the commencement of each description.

THE PIGMENTED PAPER.—This is fine paper coated with certain colloid bodies, and with the pigments which are to determine the colour of the picture. It is manufactured and sold by the Patentees both in the sensitive and insensitive state respectively.

The Autotype Pigmented Paper or Tissue is made in several different colours to suit the purposes for which they may specifically be desired, and it is one of the great advantages of this method of producing photographs that almost any tint or shade of colour may

be obtained. The following list will show the tissues most suitable for various purposes:—

For ENLARGEMENTS and large pictures generally.—The *Autotype Purple* or *Autotype Brown*. These colours have for their basis a pure black pigment, modified to a brown or purple tone by permanent blue and red.

For ENGRAVINGS.—*Engraving Black*. A pure black tissue.

For MONOCHROMES.—*Warm Black*. The black pigment of the preceding modified with permanent red.

For SEPIA DRAWINGS.—*Sepia Tissue*. A preparation exactly resembling the colour of a warm sepia drawing.

For RED CHALK DRAWINGS.—*Red Chalk Tissue*. As its name implies a tissue matching a red chalk drawing.

For PORTRAITS.—*Portrait Brown* or *Portrait Purple*. Two tissues of great beauty and brilliancy, made with permanent pigments ground with the utmost care, and producing pictures incomparably superior to silver.

For TRANSPARENCIES.—Especially intended for the reproduction of negatives. The *Autotype Transparency Tissue*. This is made with filtered colour, shows no grain or texture even when enlarged to 10 or 12 in. diameter, and is perfect for the production of enlarged negatives.

Having selected the tissue suitable for the purpose for which you intend to employ it, the first business is to cut it up.

Materials for cutting tissue.

For cutting upon, the best thing to have is a piece of stout zinc about 30 inches by 24, cut square and true; now with a three-cornered file, mark it off into inches on all the sides, and number them by scratching on the zinc from right to left 1 to 24, 1 to 30; this will be a little trouble at first, but be amply compensated for by the ease and facility it gives in cutting: provide yourself with a T square, it should have a metal edge or your knife will soon ruin it; a good shoe knife with a square (not a round) point is as good as anything to cut with; provide four pieces of lead about the size and shape of a two-ounce weight, and with a piece of fine sandstone, to sharpen the knife upon, you are complete.

Hints as to the actual mode of cutting up tissue.

To cut the tissue, unroll it gently, put it on the zinc cutting plate, put the lead weights upon it, place its edge square against the lower edge of the plate, and square up the tissue by cutting a strip off the right-hand edge, then registering it to the right-hand edge of the plate, shift it up so that you can see the numbered inches, apply your straight-edge and make clean cuts right through the tissue.

The keeping of cut tissue.

The cut tissue should be kept under a heavy weight so as to come out tolerably flat when you wish to sensitize; a couple of metal plates with a 4-stone weight are about as good as anything. The tissue being cut is ready for—

Apparatus, materials, and chemicals required for sensitizing.

SENSITIZING.—Provide yourself with a tin or zinc bath, 2 in. larger each way than the largest sheet you intend to use, and about 3 in. deep; another tin or zinc bath 2 in. larger each way than the other; a glass plate 2 in. larger than the sheets of tissue proposed to be sensitized; and a wooden stool about 12 in. by 9 in. to stand in the larger bath, and high enough to stand up about an inch above the top of it. You will require a large 2-gallon earthenware jug, with a piece of muslin tied loosely over the mouth so as to form a shallow bag; a broad camel's hair brush; a double rubber soft squeegee; an egg boiler; some sheets of common cardboard larger than the tissue; a quire of red blotting paper; and a little of the ordinary india-rubber solution thinned with benzole.

The best place for drying.

The best place for drying is in a room with an ordinary fire-place; by this means you get the minimum of heat, with the maximum of ventilation, this being the characteristic of ordinary English stoves.

The sensitizing bath

To make the sensitizing bath, take 15 ounces of pure granulated bichromate of potash, put it into the muslin covering your 2-gallon jug, and pour upon it as much hot water as the jug will hold, or as much as will reach the bichromate salt if it should not all happen to dissolve when you pour hot water over it, allow it to stand till cool, and when perfectly cold it is ready for use.

Preparation of materials for drying the tissue.

Next prepare the cardboards: tie a piece of fine twine about 12 in. long to the middle of one end of each piece of cardboard, at the other end cut a slit about half-an-inch long exactly opposite, then make a knot in the twine, bend the card into the shape of a bow, slip the twine into the slit, the knot being on the outside, and you have an arch of cardboard to support the blotting paper on which the tissue is to be dried. These cardboards can be suspended by passing a cord through them, or arranging splines to stick out from a wall or shelf.

Details as to the method of sensitizing tissue.

Place the sensitizing dish upon a table or bench before a window with a yellow blind, and to the right of it place the larger dish, in which put the wooden stool, and upon it the sheet of glass; have the squeegee handy, and the egg boiler in such a position that you can easily see when the sand has run out; untie the muslin from the top of the large jug, and pour the solution without making more bubbles than you can help into the sensitizing bath, which of course ought to be perfectly clean.

Now you are ready to begin. If you are sensitive to bichromate, liable in fact, as some people are, to bichromate poisoning, arm the first finger and thumb of each hand with india-rubber fingerstalls, or dip them into the diluted india-rubber solution and allow to dry: either of these methods will protect the skin from the action of the bichromate, and so prevent the absorption of, what is to some persons, an absolutely poisonous salt.

To have sufficient fluid in the bath.

The sensitizing bath should have, at least, 2 in. of fluid in it, and the first step is to immerse the tissue without allowing air bubbles to adhere to the surface. Take up the sheet of tissue with both hands, and bending it into a convex shape, lay it on the bath so that it touches first in the middle; now lower each end, and with the camel's hair brush push it bodily under the fluid. Turn your egg boiler; now give your attention to the tissue, with an eye now and then cast in the direction of your time meter, viz., the egg boiler.

Avoidance of air bubbles.

With the camel's hair brush wipe off any air bubbles there may be on the back of the tissue; *be sure and get rid of them*, then turn the tissue over and attend to the face, brushing it over carefully in every direction, now turn it

down, carefully avoiding any splash or disturbance ; about this time you will see that the sand of your egg boiler is running low. As soon as the sand has run out, take up the tissue by two corners with the thumb and finger of each hand, and lift it SLOWLY out of the fluid ; let it drain for a few seconds, then holding it over the glass plate allow a few drops of the solution to fall from it on to the plate, and then lay down the tissue on the glass very carefully ; here it should be left till the next piece of tissue is immersed, the egg boiler turned over, and the air bubbles chased away.

Application of the squeegee to the sensitized tissue.

Now come back to the tissue on the glass. Place two fingers close to the left-hand edge, and holding the squeegee *quite* in the *middle*, pass it over the tissue slowly and steadily with moderate pressure from left to right, so that the back of the tissue is made surface dry : if necessary, go over it again, but one application of the squeegee should be sufficient. Raise the squeegeed sheet slowly and steadily from the glass ; if it sticks very tight, you may take that as a hint to be a little quicker in your movements next time ; if the sheet remains too long on the plate it will stick altogether. Having got off the sheet, lay it *face uppermost* on a sheet of blotting paper, place this upon one of your arched cards, and hang up to dry ; treat sheet by sheet in this way. If your room has had a fire burning in it during the day, and you excite at night, the tissue will be perfectly dry and in good order by the morning, and you will never be bothered with irregular sensibility, reticulation, or any other trouble. Do not forget to darken the room, and when you leave it, lock the door after you and pocket the key.

The proper drying and keeping of the tissue.

Supposing that you have excited your tissue in the evening, it should, if your drying room has been suitable, be ready to take down the next morning. It should then be cut up into the sizes for use, and put into tin trays, fitted with heavy lids just to drop inside them ; the lids should be made of wood, with stout sheet-lead of the same size as the wood screwed to the bottom ; by this means the tissue is kept flat in the most convenient form for the pressure frame, and the light and atmosphere perfectly excluded.

Special cautions as to temperature.

In drying tissue it must be borne in mind that gelatine, of which the coating is composed, swells up in cold water and absorbs a considerable quantity thereof without dissolving, but that if the temperature be then materially raised, solution takes place, causing the film to run into drops, and the regularity and continuity of the surface to be deranged.

It is for this reason that the adoption of the squeegee is recommended to remove the excess of fluid from the paper at the back of the tissue compound.

One other precaution has to be taken, viz.—that in very hot weather the temperature of the solution itself should not be allowed to exceed that of 60° or 65° , as a higher temperature than this would suffice to soften and commence the solution of the compound during the immersion of the tissue, short though the time required may be.

To obviate this difficulty, it is simply necessary to cool the solution below 65° , which may be done with facility by the introduction of a small piece of ice, the solution of which in the liquid speedily reduces the temperature to a sufficient degree.

This precaution, however, is rarely necessary in this country except during the very hottest days in summer.

THE EXPOSURE OF THE SENSITIVE PIGMENTED PAPER TO THE ACTION OF THE LIGHT.

Materials.

SENSITIVE pigmented paper, grey or black paper, pressure frame, bibulous paper, American cloth, actinometer and sensitive paper for ditto, cutting knife, sheet of zinc, cutting shapes, and a bottle of Bate's black.

Any of the frames ordinarily in use will answer perfectly well, though as no image is visible on the exposed paper it is quite unnecessary to have the back jointed as for silver printing. As the pigmented paper is extremely sensitive to moisture, it will be found advantageous to place a few sheets of perfectly dry bibulous paper on the back of the pigmented paper when placed upon the negative in the printing frame, and cover these with a piece of American cloth; by this means, moisture and damp are effectually excluded.

Ascertaining the sensibility of the excited tissue.

Before commencing to print, it will be necessary to ascertain the sensibility of your tissue to the action of light, as compared with the silver paper ordinarily in use. This is most easily effected by having an Autotype actinometer fitted with the silver paper you are in the habit of using. Now select a negative of medium density, one that you can spare, and keep apart as a test negative, put a piece of tissue upon this, and expose it to the light at the same time that you expose your actinometer, let it remain in the light till the actinometer has reached say 6 tints, that is till the number 6 appears faintly on the tint and shews as a white number on the tinted ground. If on developement this is found to be the right exposure, mark the negative 6 tints, if too much or too little, try again until you get it right, then mark it and keep as your standard negative to be referred to as a guide in marking your other negatives.

Preparing the negatives for printing.

Having obtained a satisfactory print from your standard negative, prepare your other negatives for printing, either by placing masks upon them if for portraits, or pasting round the edge four strips of grey or black paper, or running a line of Bates' black varnish round the edges, about one-eighth of an inch wide, on the glass side, forming the safe edge.

If the negative be larger than the wished for print, lay over the back of the negative a piece of paper, and out of it cut an opening to show the portion of the subject to be printed. This must be smaller than the pigment paper, which *in all cases*, should have an edge only partially acted upon by light, of at least one-eighth of an inch in breadth; one-quarter of an inch is still better. This edge, thus preserved in the partially soluble condition, greatly increases the adhesion of the exposed pigment paper to the support, and materially facilitates the succeeding operations.

Marking the number of tints upon the negatives.

Before beginning to print, it will also be necessary to mark upon the negatives the number of tints they require; for that purpose lay your standard negative upon a large piece of glass supported at an angle opposite to a window, and placing the negatives you are going to print beside it, mark them with the number of tints you think they will require, the standard negative being your guide.

Carefully wipe the negative before placing in the frame.

Now put the negatives carefully into the pressure frames, dusting them over with a soft camel's hair brush to remove any dust or particles which would adhere to the tissue by pressure, and form specks and blemishes.

Cutting the pigment paper.

Lay a sheet of the sensitized paper upon the zinc plate, and with a sharp knife and a glass or zinc cutting shape, cut a piece the size of the negative, or the size of that portion of it included by the strips of paper forming the safe edge; now with a soft cloth or brush remove all dust and particles both from the face of the negative, and the face of the tissue, and lay the latter carefully upon the face of the negative placed in the pressure frame, upon it place three or four sheets of bibulous paper, then the piece of American cloth glazed side downwards, fasten up the frame, and it is ready for the next operation.

Wipe the tissue with a very soft cloth or leather before putting into pressure frame.

Before putting the tissue into the frame, wipe its surface with a piece of fine muslin or wash-leather, place it carefully upon the negative, fasten up the frames and expose to light, at the same time putting out the actinometer. When the silver paper in the actinometer has reached the required tint, the frames must be retired, and the pieces of tissue will be ready for the next operation.

Freshly sensitized tissue not in the best condition.

Before proceeding further, it may be as well to remark that tissue always produces better pictures if used a day or two *after* being made sensitive to light; there is much less danger of the lights washing away, and softer and better pictures are produced with tissue in this condition, than with freshly sensitized. The general practice seems to be to sensitize the tissue one day, and use it the next, but it is one of the great mistakes of pigment printing to use the tissue too freshly sensitized.

The continuing action of light.

There is one more matter that should be mentioned, which, although not likely to have much bearing upon general practice, may occasionally be utilized, and that is the continuation in darkness of the action set up by the light; thus, pictures known to be under-printed in the latter part of one day, will by the next morning, have acquired as much force as if they had had a proper exposure. In the dull days of winter it would be very possible to organize a system by which the pictures might be given a shorter time of exposure than would be necessary in ordinary cases, and by keeping till next day, be capable of being developed into perfect pictures, and as a matter of fact it has been found that this is a most admirable way of preventing the washing up of the delicate half-tones.

DEVELOPEMENT OF THE LATENT IMAGE.

UP to this point the manner of proceeding in Autotype printing will be the same whatever may be the nature of the support upon which the picture finally rests; this may be paper, canvas, wood, ivory, porcelain, glass, opal, metal, &c., in fact a variety of substances, thus opening up to photography an extended field, including not only the production of views and portraits, but enabling permanent photographic reproductions and fac-similes to enter largely into many kinds of illustrative and decorative art.

The different methods of support and developement will be now described, commencing with the most simple, being that known as the Single Transfer Process.

Preliminary reference to support and developement,

The exposed paper having been withdrawn from the frame, has now the latent picture upon the face of the pigment compound in an insoluble state; while much of this substance at the back of the print, in contact with the paper upon which the compound is laid, remains soluble, and, on being washed away, reveals the picture: but for the latter to be preserved, it is obvious that it must first be mounted upon some *support*, to retain it uninjured during the washing. It is the mode by which this is effected, which constitutes the essential difference between the manipulations of the new Autotype processes and those of its predecessors. Fargier employed collodion; Swan, india-rubber; Johnson nothing but atmospheric pressure upon the picture film itself, supported on some impermeable surface; whilst Sawyer employs a couche of insoluble gelatine, adhesive in a moist condition, and having a contractile property which permits the picture to leave its surface when dry.

General principles.

If the pigment film, after exposure, be plunged into water for a very short space of time, and be then laid upon any plane surface impermeable to water, it will firmly adhere

thereto, provided air be carefully excluded from between the surfaces, and it will equally adhere to paper prepared with insoluble gelatine, or other colloid body, when the two surfaces are brought into contact in a moist condition.

The Single Transfer process of Development.

MATERIALS.—Four zinc or porcelain trays, blotting boards, sheet of zinc, squeegee, American clips, earthenware pan for alum solution, a supply of hot and cold water, Single Transfer paper.

SINGLE TRANSFER PAPER.—This is fine paper prepared with a gelatinous or colloid substance, which although insoluble in water, swells upon immersion, and acquires sufficient adhesive power to hold the picture both during development and finally.

The Single Transfer Paper is sent out by the Autotype Company in bands of 12 ft. in length by 30 in. in width: this may be had either thick or thin paper, and in this form is very suitable for large work.

For portraits the Company supply a very fine paper in sheets, having a beautiful surface, by the use of which pigment prints having all the lustre and transparency of silver prints can be easily obtained.

The transfer for development.

To effect this, the pigmented tissue upon being taken out of the printing frame is immersed in cold water, together with a piece of the Single Transfer paper somewhat larger than itself, the two surfaces are applied to one another under water, and both drawn out together the moment the tissue loses its rigidity; the effect of which is to bring the surfaces into contact without air bubbles intervening. They are then placed upon the sheet of zinc the tissue uppermost, and the squeegee applied as follows:—place two fingers of the left hand upon the left-hand edge of the paper, and with the india-rubber scraper or squeegee in the right hand, with a motion from left to right, *scrape* out the water from between the surfaces of the pigment paper and plate. Do this two or three times if necessary, then repeat the operation in the opposite direction, so as to drive out all the air from between the surfaces. This can be done with perfect certainty after a little practice, but if it be not done thoroughly, the process fails. When the sheets have been thus forced into intimate contact, they should be placed between bibulous boards for a few minutes or may be hung up to a string with American clips: by the time about a dozen pictures are thus transferred, the first ones will be ready for the next operation.

The Developement This is effected by immersing the united papers in one of the trays filled with water, the temperature of which may be, from 90° to 110° Fahr. In the course of a few seconds a partial solution of the gelatine compound will take place, evidenced by portions of the coloured gelatine exuding from the edges of the pigmented paper; when this occurs, the paper upon which the pigmented tissue was supported may be gently drawn away from the transfer paper, which will be left with most of the coloured compound adhering to it, and presenting the appearance only of a black, slimy-looking sheet. If the water be then allowed to pass over the surface, laving it gently with the hand, the picture will gradually appear, as the excess of colour is dissolved away. If the exposure has been correct, the picture will appear with all its details to perfection.

Errors in exposure. If the exposure has been too long, the gelatine compound will dissolve with some difficulty, and the resulting picture will be heavy in the shadows, and the lighter tones will be wanting in clearness. If, on the other hand, the exposure has been insufficient, the compound will dissolve away quickly, leaving the developed picture bare and chalky in the high lights, and lacking vigour in the shadows.

Of course a proper exposure ensures the most perfect result, but there is an advantage attending this process, that an under or an over exposed picture may be made fairly presentable by modifying the developement; using hotter water than usual in the case of an over-exposed print, and which may be further reduced by soaking for a short time in water at a higher temperature; and on the other hand an under-exposed print may often be saved by removing it, when partially developed, from the warm water, and continuing the developement in cooler water.

Picture to belighter The picture should always appear a little lighter in the water than it is wished for finally, as it dries up a shade or two darker. The developement being completed, the print should be transferred to another trough filled with cold water, which at once arrests any further action upon the gelatine, and it is now ready for

The Fixing. Prints thus produced do not really require "fixing," using the word in its proper sense, as the picture being produced by the formation of insoluble gelatine would not be liable to any further change whatever, but in many cases some of the sensitizing salts are left in the paper, which mere soaking in water does not readily remove.

Alum bath. To effect the removal of these salts, place in the earthenware pan a solution of common alum of the strength of one part of alum to thirty parts of water, and allow the print to remain in this until every particle of yellow colour caused by the excess of chromic salt, has *entirely* disappeared; the alum solution having a very strong solvent action upon the chromic salt will soon accomplish this; but it is very important that this operation should be fully completed, otherwise the germs of deterioration and decay are certainly left in the print. Allow the print to remain in the alum some time after the yellow tint has disappeared, then transfer it to another tray containing perfectly clean, cold water, allow it to remain long enough to wash all trace of alum out of it, then rinse with a little cold water, and hang up to dry.

Pictures thus produced, unless from reversed negatives are inverted, and as the vast majority of negatives already in existence are not reversed, it is obvious that to utilize these, some method is necessary to correct the inversion.

The process by which this is achieved is known as the Double Transfer Process, and consists in developing the image upon a *temporary* support.

DOUBLE TRANSFER PICTURES FROM SAWYER'S FLEXIBLE SUPPORT.

FOR small work, cartes, cabinets, and up to imperial size, no process hitherto discovered equals the developement on wet collodion, to be presently described; but for pictures from 12 in. by 10 in. up to the largest sizes for pictures to be transferred to canvas, opal, glass, wood, &c., the Flexible Support is the most simple and certain, and produces very good results, scarcely inferior, if at all, to prints on albumenized paper.

Nature of the Patent Flexible Support.

Paper made especially for the purpose is coated by steam machinery very evenly with a solution of gelatine rendered insoluble by means of chrome alum. When perfectly dry, this is again coated with a solution made by dissolving button lac or bleached lac in an aqueous solution of soda and borax; this is then dried and rolled with powerful pressure between polished plates.

Before using it must be treated in the following manner:—Rub the glazed surface with a piece of soft flannel moistened with a little of a waxing compound composed as follows: yellow resin six drams, pure bees' wax two drams, turpentine one pint.

Having rubbed this well into the surface-coating, polish it off with a second piece of flannel, let it remain a few minutes for the turpentine to evaporate, and it will be ready for use.

The temporary support may be used many times, but it will always require re-waxing before use, otherwise it will be impossible to strip the pictures from it.

Employment of the Patent Flexible Support.

To carry out the process in the best manner, all that is wanted is a set of tanks, five in number, with an earthenware dish or pan for the alum, all of dimensions proportioned to the size of the work proposed to be

done; the tanks should be of stout zinc; the complete set will consist of two about 6 in. deep, three a little shallower, one alum bath, these with a supply of hot water, and a few dozens of American clips attached to splines of wood, is absolutely all the apparatus necessary.

Having the tissue printed as previously described, cut the flexible support to any size not smaller than the tissue about to be developed.

Fill one of the baths with *clean* cold water, and in it immerse one by one the pieces of temporary support, (after they have been properly waxed,) dashing the water over the surface of each to avoid air-bubbles; they will first curl up and afterwards straighten themselves out, when this occurs turn all the pieces face downwards; it does not matter how long they remain in the water, but when they are flat they are ready to use.

Now taking a piece of printed tissue bearing the latent image, slip it edgeways into the water to avoid taking down air, and bring it under one of the pieces of support; lift both out together *rapidly*, lay the adhering pieces with the back of the printed tissue uppermost, upon a piece of slate, glass, or metal, apply the squeegee lightly, and in two or three minutes the picture will be ready for—

The Development

Fill another bath with water at a temperature of about 100° Fahrenheit, and in it immerse the prints attached to their temporary supports; in a few seconds the paper on which the tissue is made can be easily skinned off, and the picture having had the water well dashed over it to remove air-bubbles, may be floated face downwards, to develop by itself whilst another is being got ready; the development is completed by simply dashing the warm water over the surface, applying it more energetically to any part it is desirable to make lighter, and a jug of hot water of a temperature of 120° or 130° will allow of very considerable modification in lightening up portions, by allowing hot water to be poured upon them, so that the development is under infinitely more control than in ordinary silver printing.

When the picture is satisfactory it is placed in a third tray of cold water, which stops all further action; it should now be immersed in a bath of alum, one part of alum to thirty of water; this should be in the earthenware pan; allow it to remain in this fifteen minutes, it should then be rinsed in cold water, and is ready at once for the final transfer (see p. 29).

PICTURES BY DOUBLE TRANSFER FROM GLASS COATED WITH COLLODION.

THE method of Double Transfer from rigid surfaces (glass being especially mentioned) was patented by Mr. Johnson in England, France, Belgium, and Austria, in 1868. The use of collodion both wet and dry was suggested by the same gentleman in the first edition of the Autotype Manual, and is to be found in all successive editions. Formulæ for waxing compounds were also given in the same work, and Mr. J. A. Spencer pointed out so early as 1870, in the Photographic Journals the fact, that the quality of the picture depended very much upon the quality of the collodion employed, he also indicated at that time some of the conditions necessary to secure success.

Early notions with respect to tissue developed on wet collodion not leaving glass when dry.

There were, however, certain difficulties in the way which it seemed practically unable to overcome; if the glass were collodionized, the collodion film allowed to dry, and the exposed pigment paper mounted on this, it seemed impossible to develop it without the picture breaking up, and the film floating off the glass; if, however, on the other hand the plate were collodionized, allowed to set, and then plunged into water, the picture might be developed upon this with perfect ease, but unfortunately it could not be persuaded to leave the glass on the application of the transfer paper. It was not till Monsieur Lambert shewed that if the glass were properly treated with a fatty body *before* applying the collodion, the developement could then take place on the *wet* collodion film, and with the power of transferring the developed picture to transfer paper, retaining the beautiful lustre of the glass surface upon which the collodion rested. There can be no doubt that Monsieur Lambert by this "happy thought" has supplied exactly what was needed to make printing in permanent pigments, practicable for the smaller sizes of photographs.

Waxing the plates. Having your sheets of opal of a convenient size, say 15 in. by 12 in., lay one of them down upon a few sheets of blotting paper, pour into the middle a small quantity of the waxing compound, composed of one hundred grains of pure beeswax, dissolved in twenty ounces of *pure benzole*; with a pad of "Papier Joseph," rub this well into the plate, and with another clean pad of "Papier Joseph" *polish* the wax remaining on the plate. Be careful if the plates are new, not to polish off too much. When the plates have been used a few times, there will be little or no danger of this, but with new plates, the sticking of the picture is very often a consequence of polishing off the wax too closely.

The plates to be gone over with a dusting brush and stored for use.

The plates being properly waxed, should now be dusted with the camel's hair dusting brush, then reared up close together ready for use. They should be prepared some time before they are required for use.

Collodionizing the waxed plate.

Having one of your trays about half full of perfectly clean water, coat one of the plates with collodion in the usual manner, the same as for a negative, and allow the collodion after being poured from the corner, to set well; then plunge it into the water contained in the bath, and allow it to remain there until the water ceases to flow irregularly from the plate on its being lifted out; when this takes place the plate is ready for the exposed tissue to be placed upon it.

Placing the exposed tissue in *cold* water.

Fill the other bath with clean cold water, (the temperature in summer should never exceed 60°): immerse the sheet of tissue in this, passing the hand carefully over its surface to remove any adherent particles, and allow it to remain there until, having at first curved inwards towards the film, it just begins to straighten itself out.

Laying the tissue down on the collodionized plate.

In the mean time take the collodionized plate from the water, rinse it well under the tap, and lay it upon the wooden stool in the same manner that you placed the glass plate in the operation of sensitizing the tissue. Take care that there is plenty of water on the collodion plate, so that if you do not happen to lay down the picture exactly in the right place, you may float it to its proper position without injury

to the collodion. Having got your collodionized plate on the stool, take the limp sheet of tissue from the water, and place it upon the plate resting on the stool, letting it touch only in the middle at first, and gently lowering each end successively.

India-rubber cloth
and application of the
squeegee.

Now lay the piece of india-rubber cloth over the plate with the india-rubber side uppermost, and, holding the cloth with the left hand close to the edge of the plate, dip the squeegee into water, and placing it a little to the *left* of the centre of the plate, with a steady stroke drive out the water from left to right; then, holding the india-rubber cloth with the right hand, take the squeegee in the left, and commencing a little to the *right* of the centre, drive out the water from right to left: a few light strokes of the squeegee both ways will complete the operation.

Plates to be placed
under pressure.

The plate should now be placed between sheets of blotting paper, and put under moderate pressure from five to fifteen minutes. Should vignettes or pictures with white margins be desired, the time for the plate to remain under pressure should never exceed five minutes, as, with a longer time, the purity of the whites cannot be absolutely relied upon.

The developement
of the latent image in
warm water.

After the plates have been under pressure, they are then ready for developement. They should be placed in warm water of a temperature not exceeding 100°; when first placed in the water, it should be dashed over them to remove any air bubbles that might form on the back of the tissue, then allowed to remain until the pigment begins to exude from the edges of the paper. When this takes place it is a sure sign that the gelatine is sufficiently softened to allow of the paper being peeled off, which must now be done by gently rubbing up one corner, laying hold of it, and it will be found to come away with tolerable facility. This paper, being useless, may be thrown into a box kept for that purpose.

Dash the water
vigorously over the
plate as soon as the
paper is removed.

As soon as the paper is skinned off, the water should be dashed vigorously over the plate, which should then be left to *develope quietly* by itself; and here is a stage at which many pictures are spoilt: the operator, perhaps from over-anxiety to see what he has got, tries to hasten the developement by continuing to dash the warm water over

the plate from the first; he succeeds, it is true, in developing the picture quickly, but very often at the expense of the half-tones which become hard and chalky.

Mr. Johnson's
method—box with
vertical grooves.

Without doubt, the very best plan of development is the one suggested many years ago by

Mr. Johnson, and always carried out in the Autotype Company's sets of apparatus. Mr. Johnson's method was to have a vertical grooved box in which the plates, after being skinned and the water well dashed over them, were placed to develop by themselves, the vertical position of the plate giving of course every facility for the unfixed pigment to disengage itself, and leave the picture perfectly developed. If the plan of the vertical box is adopted, one made to hold a dozen plates will be sufficient, and by the time the last one is put in, the first will probably be completely developed, requiring perhaps only a little rinsing with warm water to make it complete. The plate should now be rinsed under the cold-water tap; a solution of alum, one part to twenty, poured over it two or three times; another rinse under the cold-water tap, and the plate reared up to dry.

Remedies for under
and over-exposure.

Should your pictures appear to be under-exposed, development in very cool water may perhaps save them; if on the contrary they are over-exposed, a long immersion in slightly warm water may perhaps bring them down sufficiently; but it must not be forgotten that no amount of treatment with hot water will ever save an over-exposed picture on collodionized glass, you will only succeed in making the half-tones and high lights chalky, whilst the shadows will remain as heavy as before. The only chance of saving an over-exposed picture is by long soaking in slightly warm water.

Spotting and re-
touching.

If the pictures do not require any spotting or re-touching, the transfer paper may be placed upon them whilst they are still wet; but as that is rarely or ever the case, it will be advisable to treat of these operations separately (see p. 28).

After the plates are alumned and well rinsed with cold water, they should be reared up to dry in racks, or on shelves arranged so that they have a free current of air.

SPOTTING AND RETOUCHING.

PICTURES developed on the Patent Flexible Support may be retouched or spotted with water colour after mounting in exactly the same manner as silver prints, but in order to retain the polish and brilliancy of the surface given by the collodionized glass, the pictures must be treated before the transfer paper is applied.

Spotting and Retouching Pictures developed on Collodionized Glass.

Materials for spotting. The best material for spotting the pictures before they leave the glass is oil colour, diluted with turpentine as it is used. Provide yourself with a tube each of ivory black, indigo, and madder lake; two or three sable brushes of different sizes, a small bottle of turpentine, and a white earthenware palette will be necessary.

Mode of spotting. Lay the glass bearing the photographs on a plate of clear glass, supported at an angle opposite to a window, and press a small quantity of colour from each of the tubes on to your palette; mix them to the tint of the picture, and taking up a little turpentine in your brush thin it down as required, and go carefully over the pictures: the colour will dry almost immediately.

THE FINAL TRANSFER.

THE pigment pictures having been developed on the temporary support, require the final transference to the paper upon which they are to remain.

This final transference overcomes the inversion common to pictures produced from negatives taken in the ordinary manner, and presents objects in their correct positions; further it is of considerable advantage in permitting the total elimination of the chromic salts while the picture is on the temporary support, thus doing away with all chances of the fading, or deterioration of the picture.

Apparatus. Three zinc trays, stool, squeegee, piece of American cloth, Double Transfer paper, hot and cold water.

Double Transfer paper. This is paper coated with an enamel composition, insoluble in cold water; but becoming soft and slimy in that agent, heated to a temperature of 120° or 130°. This composition hides the fibre of the paper, and containing opaque pigment, may be tinted or toned to any shade.

The Double Transfer paper is made in bands of 12 ft. in length by 30 in. wide, on either thick or thin paper, and in three shades of colour, viz., opal, azure, rose. The azure being a very delicate blue tint gives an exquisite result, enhancing the brilliancy of the high lights.

For very delicate portrait work the transfer paper is made in sheets very carefully by hand, coated with a dense pigment hiding entirely the fibre of the paper, and produces the most charming results. This can also be had in the three shades named above.

The Practice. Arrange the trays on the table, fill the left-hand one with warm water 90° to 120°; put the wooden stool in the middle one, and in the third place very clean cold water.

Cut pieces of the Double Transfer paper of a proper size for the pictures to be transferred, and place them in the tray containing the cold water, allow them to remain in the cold water for half an hour so as to thoroughly soften the gelatine.

Place one of the pictures developed on the flexible support (and which may have been allowed to dry or not at pleasure) in the cold water, taking out one of the pieces of transfer paper, which place in the warm water* till the surface becomes slimy.

Now lay the picture upon the flexible support upon the sheet of glass on the stool, and rinse it with clean water, take out the transfer, lower it face downwards, of course, and avoiding air bubbles, on to the picture, adjust it to the proper place, pass the squeegee over it lightly in each direction, and hang the adhering sheets up to dry.

The drying.

When dry (which will take two or three hours at an ordinary temperature) the picture may be made to leave the temporary support with the greatest ease, by merely inserting the point of a paper knife under one corner and passing it round the edges.

To restore the brilliancy if necessary.

The picture will, in most cases, come off perfectly pure and brilliant. Should any dulness appear, a few drops of the waxing solution, or a small quantity of equal parts of methylated spirit and benzole, poured on the surface and rubbed over with a soft piece of cloth or flannel will at once make it perfect, and the result will, if the operations have been carefully performed, challenge comparison with the best work of the silver printer.

Repeated use of the flexible temporary support.

The flexible support may be used repeatedly, and is at once made again ready for use by rubbing over the glazed surface a little of the waxing compound with a piece of soft flannel and then polishing it off with a second piece: as soon as the spirit has evaporated it is quite ready for use.

* Double Transfer paper when fresh made, is always much more soluble than when it has been kept some time: it will frequently happen that it may require water of only about 90° or even 80°, and yet the transfer paper may be quite good, and answer its purpose perfectly.

THE TRANSFER OF PICTURES DEVELOPED UPON COLLODIONIZED GLASS.

THE pictures are now on the glass plates, spotted and retouched, exactly as they are wished to remain when finished. Having decided upon the kind of Transfer you purpose to adopt, cut it up into sizes half-an-inch larger each way than the plates upon which you have developed your pictures.

The application of
the Transfer paper.

Place as many of the cut sizes as you will require to use in a dish of clean cold water, and let them remain about half-an-hour, till the gelatine is thoroughly swelled. In another tray have some perfectly clean water at a temperature of from 100° to 110° Fahrenheit: in a third tray place the wooden stool. Take up one of the plates bearing the pictures, and rinse for a moment under the cold-water tap; then lay it on the stool with plenty of water on its surface; take one of the sheets of transfer paper, pass it into the warm water, in a few seconds the gelatine will have assumed a slimy condition. Now lay it on the pictures, gelatine side down of course; it will project half-an-inch beyond the edges of the plate, and using the squeegee in the same manner as described for the laying down of the tissue on the collodionized plate, with a light smart stroke in each direction, sweep out the water from beneath the transfer paper, leaving the latter in absolute contact with the pictures.

Not to use too
much force.

In applying the squeegee, a light pressure only is required; many pictures are spoiled by the gelatine being forced off the paper and over the edge, shiny specks and irregular contact being the result. With the squeegee comb off the overhanging edges of the paper, against the edge of the glass; this will get rid of the surplus paper, and by forcing the edge of paper into the roughened edges of the glass, will render the pictures much less likely to split off in the after-process of drying.

Unmounted pictures with brilliant gloss.

The treatment now necessary will depend upon the result you desire to attain. If you simply want unmounted prints, the plates must be reared up to dry, and when perfectly dry, by passing a knife round the edge the picture can be readily peeled off. To obviate the very disagreeable tendency to curl, characteristic of all pictures developed on collodion, roll them, collodion side outwards, on something round of small diameter, and keep them so for a few hours: they will rarely be troublesome after this.

THE MOUNTING OF AUTOTYPE PRINTS.

THE mounting of Autotype prints—whether Single Transfer, or by the Double Transfer process, from rigid or flexible supports—may be conducted exactly in the same manner as for ordinary silver prints; mounting them with starch, dextrine, gelatine, or any of the usual mountants. They may be spotted, rolled, or burnished, and will then present an appearance resembling fine silver prints.

Mounted pictures
with brilliant albu-
men gloss.

Pictures developed upon collodionized glass are susceptible of two or three modes of treatment, as follows:—If the pictures are desired with gloss resembling very brilliant albumenized paper, cut them after stripping from the glass to the proper sizes, and mount with very thin starch: they may, when dry, be passed through the rolling press. If you prefer the ordinary albumen gloss, put the pictures, after stripping, between damp blotting paper for an hour or so, and mount whilst damp the same as for silver prints.

Mounted pictures
with full gloss.

There is a certain charm about pictures with the brilliant surface of plate glass, spite of much that has been said about its vulgarity, &c.; and there is a wonderful and lustrous brilliancy in the shadows, a perfection in the modelling, that is scarcely attainable by any other means.

To accomplish mounting with full gloss, some little practice and care is necessary. Prepare some very thick dextrine paste, by stirring dextrine into warm water, adding it little by little till a very thick mucilage is obtained; it should be quite stiff and have no lumps in it; place the cards upon which you purpose to mount between damp blotting paper, till they are quite limp and pliable; now having the transfer paper on the pictures only *surface* dry, rub the thick dextrine well into the paper, and treat one side of the card in the same manner, lay the card

down on the plate, and press every part into close contact, put the plates under pressure with alternate sheets of damp blotting paper for half an hour, then take them out and put thin splines of wood round the edges, securing them with American clips: this will prevent their splitting off in the drying.

The drying should take place in a not too warm situation, and will take a considerable time, say a couple of days; but the whole *must* be thoroughly dry before you attempt to remove the card, otherwise it will be sure to stick, and ruin all the work. If the cards are allowed to dry thoroughly, they will leave the plate with ease, and when cut up, will lie flat and without the least tendency to that disagreeable curl which is so frequently the case.

Mounting on ordinary cards and cabinets.

The above instructions suppose that you mount all the pictures developed on one plate upon *one* card; if, however, you desire to mount upon your ordinary carte and cabinet cards, it will be necessary to mark accurately on the transfer paper, two corners (diagonals) of each picture, as a guide where to lay the cards in mounting. This will be most conveniently accomplished, by laying the plates bearing the pictures upon the sheet of glass before the window, when you will be able to see through the paper where the corners come. When the plates are marked, treat the surface with dextrine as already indicated, and having rendered the cards perfectly pliable by placing them between damp blotting paper, apply the dextrine, and lay each down using the marked corners as guides. In applying the dextrine, take special care of the edges, and be sure and rub them down closely, put under pressure with damp blotting paper for half an hour, rear up to dry, and when perfectly dry strip off the plate.

SHORT HINTS WHICH SHOULD HAVE ESPECIAL
ATTENTION.

1. CAREFULLY wipe the tissue with a soft cloth or leather before sensitizing.
2. Have the sensitizing bath always *cool*.
3. Be careful to get rid of air bubbles.
4. Dry in a room warmed by an ordinary fire-place: avoid gas or anything giving off deleterious fumes.
5. Do not use the tissue immediately after sensitizing, but keep it a day or two.
6. Be careful to have the tissue dry before placing in the frames for printing.
7. After skinning, dash the water vigorously over the plate.
8. Develop in *warm* not hot water, and as far as possible, allow the pictures to develop themselves spontaneously.
9. In applying the transfer paper, use a light pressure, just enough to put it into absolute contact with the gelatinous pictures.
10. After mounting be sure that the cards are perfectly dry before removing them from the glasses.

THE
AUTOTYPE PROCESS.

Part III.

ADAPTATIONS OF THE PROCESSES OF PERMANENT PIGMENT
PRINTING TO THE PRODUCTION OF PHOTOGRAPHS
ON VARIOUS MATERIALS.

Special description of glass necessary. *Permanent photographs on opal.*—The opal glass for this purpose should be that sold under the name of “pot metal,” and is distinguished by having the colouring matter distributed throughout the entire material of the glass; there is another kind which is known as “flashed,” in which the colouring matter is present as a thin layer upon transparent glass, but for the purposes of photography the pot metal opal is infinitely superior on account of its richness and depth of colour.

Smooth surface. The piece of opal selected should have a fine smooth (not polished) surface; if the negative should happen to be a *reversed* one, the picture can be made by single transfer, in which case the operation consists of plunging the exposed tissue into water, laying it down on the opal, the surface of which should be thoroughly clean, applying the squeegee, and developing as described at page 26 and following; when developed, washed, and passed through the alum bath, it is dried, and the operation is concluded. Should the negative be one taken in the usual manner, the following method must be adopted.

Opal pictures from ordinary negatives.

Having masked the negative and printed the picture, it must then be developed upon the flexible temporary support (page 22); when dry it is ready for transference to the opal, which operation is conducted as follows:—

Make a solution of Nelson's No. 1 gelatine one ounce, water nine ounces, soaking the gelatine in the cold water first, then raise it to a gentle heat till solution takes place. In another vessel dissolve twelve grains of chrome alum in one ounce of warm water and stir rapidly into the gelatinous solution.

Having thoroughly cleaned the opal, put it into a small tray with the above solution, or place the opal on a levelling stand, and pour on as much of the warm solution as the plate will hold; then having the picture on the temporary support in cold water, place the two surfaces together, apply the squeegee gently to get rid of the surplus of the gelatinous solution and allow to dry.

When perfectly dry the temporary support can be peeled off, leaving the picture firmly attached to the opal.

From good negatives, prints on opal have beauties peculiar to themselves, they are exquisitely soft and delicate in appearance, and are susceptible of a great range of artistic treatment in monochrome as well as in colour, and can be worked so as to be viewed both by reflected and transmitted light.

Permanent Photographs on Ivory as a basis for Miniature Painting.

Ivory free from scratches, &c.

The ivory used is the same as that employed for miniature painting, and is supposed to be sent out fit for use, carefully smoothed, and with a surface free from scratches; such however is frequently not the case; and the imperfections are not visible until after the ivory has been immersed in water, then the marks and scratches previously filled up by the white powder of the ivory shew in a very disagreeable manner.

To smooth the ivory When this occurs, take a piece of fine cork and with a little water and some cuttle fish powder go carefully over every part of the ivory; when the surface is satisfactory wash with distilled water and wipe dry with a clean soft cloth.

A photograph on ivory should always be done by the Double Transfer process, as any attempt to develop the picture direct on the

ivory, will so stain the material with the free bichromate left in the pigment paper, as to render the ivory utterly useless.

Having the picture printed and developed on the flexible support, take a piece of ivory of the proper size with its surface perfectly clean and free from marks or scratches, immerse it face to face with the picture in the gelatinous solution as named in the preceding section, apply the squeegee carefully and allow to dry.

The temporary support will peel away with the greatest ease, and leave the picture on the ivory in a most perfect condition for working in monochrome or colour.

*Permanent Photographs on Drawing Paper as a basis for work
in crayon, water colour, &c., &c.*

Always by Double
Transfer.

The pictures for this purpose, should by preference be printed by Double Transfer, for if the picture is developed upon the drawing paper direct, the thick heavy texture of the paper absorbs so much of the bichromate solution as to render it difficult to thoroughly discharge it, and it cannot be too often noted that the presence of chromium compounds in the finished picture is a sure cause of its deterioration.

Gelatine solution.

The drawing paper may be fine, medium, or coarse, according to the kind of picture wished for, it must be prepared with a solution made as follows:—Nelson's flake gelatine one ounce, water one pint, soak and dissolve by means of heat, dissolve twenty grains of chrome alum in one ounce of warm water and stir briskly into the gelatinous solution.

Coating the paper.

Pin the drawing paper upon a board, and coat it with this solution, using a broad camel's hair brush, do not put too much on at once, and take care that it is evenly coated; allow the first coating to dry, then go over it again in a similar manner and when the second coating is dry it will be ready for use.

Having the picture developed on the flexible temporary support and which has been allowed to dry, immerse it in cold water, then immerse the drawing paper, coated side downwards, in warm water of a temperature of 110° : when the gelatine has just become softened, put the two surfaces together under cold water and

apply the squeegee; when dry, the temporary support will leave the picture on the drawing paper.

Rigid support prejudicial.

Pictures intended for drawing paper should never be developed on a rigid support, because in the transference the drawing paper is flattened down upon the rigid plate in drying, which to a great extent destroys the texture of the picture which it is the object of this method to retain; the flexible support on the contrary, allows itself to be pulled to the rough surface of the drawing paper, and when stripped off, presents a very perfect facsimile of the texture.

Permanent Photographs on Canvas and Panel as a basis for Oil Colour Painting.

Many experiments have been made and many difficulties have presented themselves, before pigment pictures could be made to adhere satisfactorily to prepared canvas or panel, so as to warrant their being sent out as a permanent basis for oil painting.

Special tissue.

A special tissue is necessary containing a very large quantity of pigment, and the quality of that pigment is a great item in the success of the process. The picture when on the canvas must not be in a filmy or horny condition, must have no heavy gelatinous masses about it or it will be almost certain to peel after it has been painted, the result being destruction to the picture. It is felt that the design of this book being to give practical information upon every branch of permanent pigment printing, this could not be omitted, but it is a process involving such special skill and experience, that unless the operator is perfectly sure of his manipulatory powers, it will be unwise to trust a valuable oil painting upon this basis.

Preparation of the painting ground.

The first step is the preparation of the painting ground—the canvas or panel is that usually sent out by the artist-colour makers for oil paintings, and for this purpose must have the distemper preparation of oil so treated, as to enable the pigment picture to adhere permanently to it. The canvas must be stretched on a smooth board, and being brought over the edge must be tacked at the back, the surface must then be well scoured

with soda, using a stiff scrubbing brush until the fibre of the canvas is reached: this will leave very little of the original preparation, but there will be enough to fill up the interstices of the canvas, and to form a smooth, even, painting ground.

Gelatine solution.

The canvas or panel must now be allowed to dry: make a solution the same as for drawing paper, page 38 (gelatine one ounce, water one pint, chrome alum twenty grains, water one ounce), with a broad flat camel's hair brush go over the surface thoroughly in every part, working the solution well into it—allow this to dry—then coat it again, allow to dry, and then a third time; let the coatings be thin and evenly spread: having the picture developed on the temporary support and allowed to dry, and the last coating on the canvas perfectly dry, cover the surface of the canvas with clean, cold water, and upon it lay the picture, previously immersed in cold water, avoiding air bubbles, squeegee the two into perfect contact, and when thoroughly dry the temporary support may be removed, leaving the picture firmly adherent to the canvas.

Thin Negative.

The negative for this purpose should not be intense, but one which produces a very thin print, as it is important that there should be the thinnest possible layer of gelatine and pigment upon the canvas, and as the picture is only required as a foundation to secure accuracy of detail, the brilliancy desirable in a finished pigment print is neither necessary or desirable.

Pigment Prints on Wood Blocks for Engraving.

Prints from ordinary negative.

As the engraving on a wood block is always reversed, a print from an ordinary negative will give exactly what is required as a guide to the engraver.

The pigmented paper for this purpose should be similar in character to that described for forming a base for oil painting, *i.e.*, a large quantity of pigment with as little gelatine as possible, in order that whilst the design appears clearly on the wood block, there should be as little resistance as possible to the engraver's tool.

Gelatine solution.

The picture being printed as usual, the wood block is coated with a five per cent. solution of gelatine—say gelatine one ounce, water nineteen ounces, soak and

dissolve, then stir in briskly chrome alum twenty grains, water one ounce—coat the wood block with this solution, using a flat camel's hair brush and spreading an even coating, allow this to dry, then apply a second coat, and when this is dry, the block will be in a fit condition to support the pigment picture.

Immerse the printed tissue in cold water till it becomes limp, at the same time pour cold water over the surface of the wood block, lay the print down, and press into close contact with the squeegee, allow to remain for five minutes, then immerse in warm water, strip and develop as in the Single Transfer process, page 20.

When the picture is developed, rinse in cold water and allow to dry very gradually in a current of cool air.

Pigment Prints for Magic Lantern Slides.

Special tissue.

In order to secure the necessary vigour and clearness to produce a brilliant picture when thrown upon the screen, a paper is required having a quantity of very fine opaque pigment—this is provided by the Company's special transparency tissue, which is made with Indian ink dissolved and filtered with extreme care.

The negative should be masked by means of black paper, with an aperture of the desired shape, to include as much of the picture as may be wished for.

Long exposure.

The picture should be printed strongly, and will require considerably more exposure than if to be developed for transfer to paper: the glasses being cut the proper size for the lantern holder, should be carefully cleaned and coated with a solution made as follows: Gelatine one ounce, water nineteen ounces, chrome alum twenty grains; with this, coat the plate by pouring on as if collodion, and allow to run off at one corner. The glasses may be prepared any time before-hand, and when dry are fit for use.

When the latent picture is taken from the pressure frame, turn up the edges to form a sort of dish, coat its face with thin collodion, and allow to dry.

Developement. Immerse the plate and the coated tissue in cold water, when the latter has become limp, place it on the glass under water, avoiding air bubbles, and force into contact with the squeegee, allow it to remain for a few minutes, then put into warm water, strip and develope as previously described—immerse in the alum and wash well with cold water.

Mounting. When dry the picture should be covered with another piece of clear glass the same size, the two being prevented from touching by very small strips of card fastened by gum to two of the edges, the whole bound round with thin black paper and the slide is completed. These pictures when laid upon white paper should only allow the paper to show through in the very highest lights, just a patch of white here and there.

Intensification of the image. Should the picture not be sufficiently vigorous, it can be easily made as intense as may be desired, by pouring over it, before it is allowed to dry, a three-grain solution of pyrogallic acid, to which a few drops of nitrate of silver have been added, in the same way that a negative is intensified.

Transparencies for the Reproduction of Negatives, or for the making of Enlargements.

Special tissue made with filtered colour. It is very important that for this purpose, the pigmented paper should be such as will give an image perfectly free from texture and granularity, and also that the pigment should be in such a fine state of division, as not to shew particles of colour even under a high magnifying power: the tissue made by the Autotype Company and named by them "special transparency" fulfils these conditions; by a special process the pigment employed is filtered under pressure, and the resulting picture partakes more of the character of a stain than of a pigment.

Superiority of carbon transparencies. The great advantage of a carbon transparency need not here be insisted upon; every known method—Collodion, Albumen, Collodio-chloride—processes of all kinds both wet and dry, have been tried exhaustively, and long experience shows, that for depth, roundness, and vigour, no method

of making transparencies will give anything like the good results of carbon—whilst the method of production is simple to a degree.

Transparencies for enlargement are usually made upon glass, and as it is well known that a wet collodion film refuses to leave the glass if the plate has not been previously waxed, the developement of the image upon such a film offers one very convenient method of proceeding.

Coating the glass.

The following is the method practised at the Autotype Works:—Having thoroughly cleaned the glass, coat it with gelatine as described for pigment prints for magic lantern slides (p. 41), print the picture very fully so as to secure all the detail when viewed as a transparency (which will require an exposure of about twice the usual time), make the printed tissue into a little dish by just turning up the edges, pour over it some thin collodion and allow it to dry, then immerse in cold water and mount, develope, and fix exactly as described at page 42 and following. When the plate has been treated as there described and is dry, it is ready for use in the enlarging camera.

Density of image.

It is of some importance that it should be of the right density; if the image is too intense, the negative made from it will require a long exposure, and possibly be too transparent to print well; if on the other hand the transparency is too thin, the negative is very likely to be overdone, flash out under the developer, and be poor and weak from the action of too much light.

Mode of estimating the density.

A very good estimate may be formed by laying the transparency down on a sheet of white paper; if the white paper shows through in many places, the transparency will generally prove to be too thin, and the exposure insufficient, but if the paper only shows in just one or two patches where the very highest lights are, the probability is that the transparency is about right. The transparency should look vigorous and full of modelling when held up to the window: there is a considerable amount of latitude allowable, and very excellent work may be produced from transparencies of very different densities.

Photographs in Pigment for Window Transparencies.

Tissue best adapted The pigmented tissue for this purpose should have the colour in rather large quantity to give the necessary vigor. The Autotype Company's special brown tone, No. 113, will be found to produce very good pictures of a fine rich tone when viewed by transmitted light.

The mounting. The tissue is made sensitive to the action of light in the usual manner (p. 11), and then deeply printed; it should be developed on gelatine, and treated exactly as described at page 43. As the picture is not to leave the glass, the glass will simply require cleaning. When dry the picture should be mounted with a piece of ground glass, binding the edges together with thin black paper, gumming small strips of card down the extreme edges to prevent the surfaces touching. Neat metal frames are to be procured, furnished with rings for hanging in windows, where they make most effective ornaments.

Pigment Pictures on Wood and other Materials for Decorative Purposes.

All that is necessary is to develop the picture on the flexible temporary support, then to coat the surface upon which it is desired to place the picture with the solution of gelatine, as described for photographs on canvas or panel; when the coating is dry, lay the picture down upon this surface with water, using the squeegee to force into contact. The temporary support may be stripped off, leaving the picture firmly attached to the material, which may now be varnished, polished, or treated in any decorative way.

Concluding Remarks.

It will be seen that the permanent pigment process lends itself to the production with ease and certainty of many different varieties of pictures. It is not pretended that this chapter has exhausted its applications; many new ones will doubtless suggest themselves to the enthusiastic amateur or professional, and the Autotype Company will always be willing to consider any proposal for a modification of pigmented paper or material, and give any assistance that may be in their power, to the carrying out of new suggestions.

USEFUL HINTS IN PIGMENT PRINTING.

Putting in Skies and Backgrounds in Permanent Pigment Prints.

As the pigment printer labours under the disadvantage of not being able to see what he is about, some means must be devised to produce effects which easy enough in silver, require special methods in pigment printing.

Landscapes frequently require cloud effects printed from a different negative. It is not a difficult matter to print these by adopting the following method:—

Holding the landscape negative up to the light, with a piece of white paper against it, trace roughly the sky-line with a black lead pencil, lay this tracing on a piece of brown paper and run over the outline with something blunt so as to mark it through on to the brown paper, which cut with a pair of scissors, and trim its edges to the *exact* size of the negative; having selected the cloud negative, lay the landscape negative upon the cloud negative, so that the cloud effects wished for, appear in the sky portion; with a piece of black crayon (which will easily rub off), go round the edges of the landscape negative, so as to mark its *exact* position upon the cloud negative, with reference to the cloud effect to be printed.

Place the blank which represents the sky, upon the *back* of the landscape negative, and place the counterpart upon the front of the cloud negative, the outline tracing of the landscape negative being the guide to position.

The printing may now be begun, the state of affairs being this—a sky mask on the landscape negative, a foreground mask on the cloud negative.

Cut a piece of sensitive tissue the *exact* size of the landscape negative, print it in the usual way; when sufficiently exposed, place the printed tissue on the cloud negative, registering it accurately by

the traced lines which give the exact size and position of the landscape negative, place in the frame, and with a piece of card just soften the edge of the sky-line by moving it up and down over the junction; the exposure will be very short in a good light, and the whole operation although lengthy in description is exceedingly easy and simple in practice.

TO PRINT IN BACKGROUNDS.—This is very simple; place a piece of white paper on the face of the negative, and holding it up to the light, carefully trace the outline of the figure, or so much of it as is wished for, lay this tracing on to brown paper and mark it with a blunt stiletto or style, so that the outline will be visible on the brown paper.

Cut round the outline carefully with a pair of scissors, and with a few dabs of strong india-rubber solution place the background mask in its position on the face of the negative. It is now ready for printing.

Cut the piece of sensitive tissue the *exact* size of the negative (it must be the exact size), and lay it accurately upon the negative so that its edges coincide with the edges of the negative; a good way to do this is to push the negative up to, say the left-hand top corner and side of the pressure frame, and make the piece of sensitive tissue also touch the top and left-hand side of the frame, expose to light as usual—take the negative out of the pressure frame, and put a few dabs of the india-rubber solution upon the *upper* side of the figure mask—now lay it (the mask) down upon the negative, fitting it in to the background; the whole being in position, and the negative of course *entirely* covered, lay the tissue, having the figure printed, down very carefully, again registering its edges with the edges of the negative, press the tissue on the figure mask which has the india-rubber solution upon it, allow to remain two or three minutes; the tissue may now be raised with the figure mask adhering to the tissue in exactly the right place to shield the figure, if the arrangement is now placed under a sheet of clear glass, a background can be printed in, toned, shaded, or treated in any way that may be necessary.

The india-rubber solution should be very thick, and it will not affect the tissue in the least, if before development what remains is rubbed off with the finger or a piece of soft cloth.

Tinted Borders with Imprint and Design.

A very elegant style of photograph has been introduced, consisting of the figure printed inside a design with tinted border, which may have inscribed upon it, the monogram, name and address, &c., of the artist.

These may be easily printed by a very convenient frame made by Mr. Higginson, of Southport, or by the patent frames of Messrs. Greaves and Smith. For those who wish to utilize their ordinary printing frames, the following method of procedure is recommended:—

The materials required are: one template of each size and shape of aperture required, black paper, one gelatine film with imprint, &c., of each size and shape required, india-rubber solution, solution of gum, thin cardboard. The templates are pieces of sheet copper or brass, with openings filed in them, and are made to suit carte, cabinet, imperial, or any other size of picture. For this method of printing and tinting a template of each size and shape of aperture are necessary. Now to make a carte mask, take a piece of black paper five inches by three and three-quarters, lay this upon a sheet of zinc, and over it lay the template, with the aperture rather above the centre of the paper, and holding the plate steadily, *mark* round the outside edge with the point of a pen-knife close to the metal, being particularly careful about the top and left-hand side; still keeping the plate in position, cut the *aperture* clean out; remove the template, there is now a piece of black paper with an opening corresponding to the aperture in the template and the edges of the plate distinctly marked; next take a piece of three-sheet cardboard, cover one side with a strong solution of gum and allow it to dry—from this, cut little squares, say of one quarter of an inch, place one of these with one edge exactly on the top *line* denoting the top edge of the template, about a quarter of an inch from the left-hand side line; place another square with its edge on the *left-hand side line* a quarter of an inch from the top line, and the remaining one, three inches *below* that, on the same line. There are thus formed, three stops, against which the square edges of the tissue (left-hand side and top) should be placed; the next thing to be done, is to make the tinter exactly to register in accordance with the printing masks.

For a carte tinter, take a piece of glass 5 in. by 4 in., cover one side of this with india-rubber solution, cover one side of a piece of black paper a little larger than the glass with the same solution, allow them both to dry; when dry, place the black paper on the glass, and rub down flat.

Upon this paper, so affixed to the glass, lay the template, and holding it steadily, cut down to the glass round the *outside* of the plate, then, taking care that the plate does not move, cut round the *inside* of the aperture, take off the template, see that it is cut through, and then *remove* from the glass the cut portion between the aperture and the out-side edge; a tinting glass will thus be produced, having an opaque blank in the middle, surrounded by clear glass, in its turn surrounded by an opaque border.

Upon this adjust the gelatine film with imprint, &c., putting a little india-rubber solution on the edges, and on the glass, &c., allowing to dry to secure adhesion: this tinter now is exactly the thing from which to make the negative in carbon, which in its turn will print as many positive tinters as may be desired, these when varnished with good hard varnish will be found most satisfactory in use. To complete them they require three little squares of cardboard putting up to the edge of the clear glass, one at the top and two at the left-hand side, in a similar position to those on the printing mask, and the registration will be perfect. Cabinet and all other sizes can be made in the same way. The advantages of this system will be obvious: the masks are cheap, can be purchased ready-made, may be placed in position on the negatives, and if put on with india-rubber solution may be removed and used for other negatives; the tinting plate is much more durable than the ordinary gelatine film, the defect of registry and objectionable white line is got rid of, and the ease and simplicity of working is remarkable.

That very admirable worker, Mr. Higginson, of Southport, goes upon a different principle: he prints several negatives at one and the same time in one frame, and tints them all at the same time by having a corresponding tinter. He makes all his negatives take the same time to print by strengthening the weaker ones with papier mineral, he is thus enabled to secure identity of time in exposure, identity of colour and remarkable simplicity in the printing operations. In cases where negatives are completely under control as regards quality and density this plan is most admirable; but for general work, involving the

occasional printing from very old dense negatives made years ago, a combination of the method described, with Mr. Higginson's, will perhaps be found best adapted to commercial purposes.

Trimming the Prints.

The best mode of trimming is by cutting with a glass shape and a long pair of paper-hanger's scissors ; of course any of the varieties of cutting knives in vogue may be employed, but they all, more or less, pull or jag the edge, and by far the neatest work is made with the scissors.

Hints on Mounting the Prints.

The objections raised to starch or gum as the medium for mounting silver photographs do not apply to the present case, as the colours of the pictures being permanent, are not liable to be decomposed by acidity in the mounting solution or the action of atmospheric air, &c. ; therefore any of these substances may be employed.

When pictures are to be mounted on small thick mounts, such as cartes-de-visite or cabinet portraits, thick starch is a very convenient material ; dextrine mixed up very thick with water is also easy of application, but as both starch and dextrine take up a great deal of water, they are liable to make the board or mount cockle very much when of large size ; to remedy this a mounting compound* has been prepared containing spirit which does away with this disadvantage.

In applying cement, of whatever kind it may be, it is necessary to avoid touching the face of the print with it, as it is liable to injure the surface, especially if friction be applied whilst it is still moist.

* Autotype Mounting Compound is prepared by the Company.

FAILURES AND THEIR REMEDIES.

To the inexperienced in pigment printing, failures will inevitably arise just as they would in any other branch of novel manipulation, and when it is considered with what uncertain compounds the manufacturers of the pigmented papers have to deal, it is a little surprising that so few of the failures arise from the materials employed.

In treating of failures, the same order will be observed as has been followed in treating the subject generally, commencing with those appertaining to the excitation of the pigmented papers and going regularly through the whole of the processes.

INSOLUBILITY OF TISSUE.—This shews itself principally in two ways—first, the tissue seems to refuse to adhere to the transfer paper or to the temporary support—second, when it is attempted to develop the image in warm water, it is found to be difficult or impossible to wash away the surplus pigments, and consequently the latent image produced by the action of the light is buried and invisible.

This state of things may be produced (*a*) by the use of a sample of bichromate of potash containing a good deal of free acid—(*b*) drying the sensitized tissue too slowly—(*c*) not being careful to exclude white light whilst drying—(*d*) by the tissue being kept too long after having been made sensitive, or not being carefully preserved from light and air; the obvious remedies for these difficulties will be found in pp. 11 to 14.

Failures in the First Transfer previous to Developement.

On attempting to develop the picture it exhibits a tendency to wash up at the edges.

If this does not arise from insolubility of the tissue, it is probably owing to a too long immersion of the printed tissue in water before mounting, the remedy will be not to allow it to remain so long in

the water, but remove it before it has had time to expand and begin to curl outwards (see special instructions on page 19).

This failure may also arise from the margin of the negative having been masked so as to print quite white, and should there be a heavy shadow in the picture coming against this white portion, it is very likely to wash up. The remedy is, to use a paper for masking that will allow the light to come through it sufficiently to print a tint.

The picture on development appears with bubbles or irregular froth-like markings.

This generally arises from air having been included between the tissue and its support, and the subsequent action of the squeegee* having been insufficient to get rid of it. The remedy will be to pass the hand carefully over the face of the tissue when placed in the water to remove the air bubbles, and not to allow any air to be included between the tissue and the support upon which it is to be developed.

There is another cause which but rarely occurs, but however, is worthy of notice ; if the water comes in from the tap at a very high pressure, there is generally a large quantity of air included, evinced by a sort of milky appearance, which disappears after the water has remained in the bath or tray for a few minutes. If the water itself is not free from imprisoned air, a perfect transfer for development is impossible.

The picture is difficult to develop and appears dark and heavy.

Due either to over exposure or to insolubility of tissue ; try hotter water or expose for a shorter period. If the tissue is *insoluble* it is waste of time going on with it.

The picture develops very readily and is too light.

Insufficient exposure or want of sufficient sensibility in the tissue by reason of the bichromate bath being too weak—give a longer exposure and see that the bichromate solution is of the proper strength, say, not less than four per cent (see page 11).

* Note especially the manner of applying the squeegee as given on p. 26.

Failures especially incident to the Developement of Pictures on Glass coated with Collodion (see page 24).

The water gets underneath the collodion, and washes up at the edges.

It is important that the plate after being collodionized (see page 25), should be handled very carefully so as not to break the collodion away from its edges, and the collodion surface should not be touched or abraded, for if a hole is made in the coating, the water will probably get under the film and ruin the developement. It is a good plan to have the plates roughed to about one eighth of an inch of the edge, and have the corners of the plate rounded off; the latter suggestion if carried out will materially diminish the risk of breakage.

Minute bubbles and froth-like markings.

Imprisoned air between the film of collodion and the picture; study the directions given on page 25, *avoiding air bubbles* and laying the pieces of tissue *carefully* down; also note the method of applying the squeegee given on page 26.

Granular texture and reticulation all over the picture.

This is a most disagreeable and troublesome failure, and is peculiar to pictures developed on collodionized glass. Most of those who meet with it for the first time, at once put it down to "bad tissue," but that this is rarely the cause is manifest that one operator will produce perfect pictures, whilst another operator will produce the most startling examples of granular structure from the same band of tissue.

To avoid reticulation, there must be a very delicate insoluble skin over the *face* of the tissue (this is produced by slow drying); it is not sufficient to interfere in the least with the brilliancy of the picture, but it holds the film together and prevents its disruption—it is for this reason that tissue coated with collodion and dried, never reticulates.

Tissue should be excited upon a five per cent solution of ordinary bichromate and treated with the squeegee, placed upon blotting paper hung over sticks carrying cardboard, and allowed to dry slowly at an ordinary temperature in a room that has had a fire in during the day (see page 13).

The sensitizing bath should never have a higher temperature than 60 degrees Fahrenheit, and the water in which the transfer to the collodion plate is effected should never be of a higher temperature

than that just quoted; these two last directions are very important in the summer time.

The loss of the half tints.

This is sometimes from the same cause as the evil for which the remedy has just been pointed out, but it is very often due to the fact of the tissue not having been excited upon a bath of sufficient strength, or that the tissue is used too soon after being sensitized; tissue excited as described at page 13, is at its best from one to three days after being excited, and will preserve the most delicate half tints; it is sometimes due to insufficient exposure, and sometimes to the water being used too hot to begin with in developing: the best method of developing is to strip the pictures in water of about 100 degrees Fahrenheit, then dash the water well over them, and put the plates into a vertical trough to *develope themselves*; they will do that admirably, and may be taken out one by one to be finished with hotter or colder water as circumstances may require.

The picture washes up from the collodionized glass.

It is important that the collodion should be allowed to *well* set, before being immersed in the cold water, and it is equally necessary that it should not have its surface broken, as if the surface of the collodion is injured, the water gets underneath and then of course up comes the picture: the developement should take place on opal plates with polished surface, the edges should be well roughened, and if the roughness can be extended to say a quarter of an inch all round the margin of the plate, so much the better, the corners of the plate, too, should be *well* rounded off, this will save lots of breakages.

The picture obstinately refuses to leave the glass.

Entirely the fault in waxing: *pure* bees' wax and *pure* benzole alone must be used, the wax must not be polished off too closely, especially when the glass is new; when the plates have been employed many times the same care is not necessary; it has frequently been observed that an old plate will allow of a picture being stripped from its surface, without being *re-waxed* at all, but new glass must have a sufficiency of wax left on.

Minute shining specks.

These arise from air imprisoned between the face of the tissue and the plate in laying down the tissue in the water for the first transfer; the remedy is to pass the hand over the face of the tissue so as to remove any adherent air bubbles, lay it carefully down, holding it by opposite corners, and letting it touch the plate only at the diagonal line at first, and then lower the corners.

In applying the squeegee, holding the plate with the left hand, begin just a little past the centre, a little nearer to the left hand than to the right, scrape off the superfluous water over the right-hand edge of the plate, then turn it round and repeat the operation towards the other edge; by applying the squeegee in this manner, any air bubbles there may be, will not have so far to travel, and will be driven clean off the plate instead of remaining to be churned into froth under the action of the squeegee.

Weak prints and the colour grey and poor-looking.

It is an axiom amongst silver printers, that a good vigorous negative will produce a fine-coloured print, and that a poor weak one can only be made to yield weak-looking prints; just the same holds good of pigment printing.

From the same batch of tissue can be produced the most brilliant and fine-coloured prints, and also the poorest and greyest looking things imaginable. To produce prints of a good colour it is necessary to have reasonably good negatives; if the negatives are thin, a weak sensitizing bath should be used and the negatives backed with mineral paper.

The picture developed perfectly on the glass, possesses an unpleasant texture and grain after its transference.

In this case it is always either the method of transfer or the transfer material itself that is in fault; this is likely to happen if the transfer paper is fresh made, or if, as in the case of some of the German papers, there is a very rough webbed appearance in the paper. Note the instructions for transfer on page 29—if the fault is supposed to arise from the texture of the paper, pass two or three pieces through the rolling press with heavy pressure before using: this will probably give them a smooth surface, and if the resulting pictures are free from the defect, it will at once show the transfer paper to be in fault.

Shining lines or patches against the edges of the deeper shadow.

This defect generally occurs where a deep shadow comes next to a strongly lighted portion of the picture, and is caused by the transfer paper not having been soaked sufficiently in the cold water to render it pliable ; so that instead of adjusting itself to the relief in which the pigment picture is formed, it bridges over the interval and the white or shining line shows the imperfect contact.

The remedy is to allow the transfer paper to soak for a longer time so as to ensure a sufficient "couche" of softened gelatine for the pigment print to rest upon in perfect contact.

The coating dissolves off the Double Transfer paper, or on the other hand it does not get into the necessary soft condition.

Either of these conditions will lead to failure in the transfer of the picture. When first made, Double Transfer paper is very soluble in warm water, requiring temperature of say perhaps only 80° or 90° Fahrenheit ; as it acquires age, it hardens, and requires a temperature of perhaps 120° or even 130°, but in both these conditions it is perfectly serviceable. The Autotype Company put the date of manufacture on every band of Transfer, and it is easy to judge about what temperature the water in which it is softened should be. A safe plan is to begin with a low temperature, and raise it gradually till the transfer paper arrives at its proper condition.

FADING AND DETERIORATION.

PIGMENT pictures are supposed to be permanent, and they are so exactly to the extent that the *pigments* employed are *permanent*; so long as the latter belong to the class known as permanent pigments, and the prints themselves are properly freed from the excess of chromic salts, pigment pictures are as permanent as paintings, engravings, water colours, and any other artistic work.

At an earlier stage of the manufacture, the more brilliant tints in tissues were obtained by the use of cochineal colour. It is well known that painters, especially in water colour, employ the various Lakes (many of which are cochineal colours) in their works, but nobody thinks of submitting a delicate and costly work of art to the action of sunlight for instance, or even of the atmosphere, it is usually kept in a portfolio, or framed and glazed, and there seems to be no reason why good photographs even though they contain cochineal colour, should not receive equal consideration, and achieve equal if not greater permanence.

But even supposing a photograph does change its colour after a prolonged exposure to light and air, there is no disappearance of the picture, it may not retain the pristine brilliancy that characterised it when first produced, but it will never fade out; its basis is pure carbon, and the picture in that material at least will always be permanent. After many efforts and failures, the Company some time ago succeeded in employing the active colouring principle of Madder, and are now able to supply tissues in absolutely permanent pigments of a brilliancy equal to those made with Cochineal Lake Colours.

The very fact of the pigment being locked up in the insoluble gelatine is in itself a very great aid to permanency. It is believed that all the pigments employed by artists, if they do not act upon or decompose the gelatine, may be employed in the manufacture of tissue, and the result will be as satisfactory as regards permanency, as that of any artistic work in water colour.

The main cause of fading or deterioration is not the colour at all, but the failure in getting entirely rid of the surplus bichromate salt. The picture must be immersed in alum, which should not be weaker than one part of alum to thirty of water, and it should there remain till all yellow colour has entirely disappeared ; this is very easy to effect in double transfer from rigid surfaces and from collodionized glass ; a little more care is required with the flexible support, and still greater watchfulness with single transfer prints ; the latter being mounted at once on the paper upon which they are destined to remain, the bichromate gets into the paper, and stains it a yellow colour ; if this is not perfectly got rid of by the action of the warm water used in development followed by the alum bath, the picture cannot be considered permanent, but will gradually lose its original colour and become of a sickly greenish yellow in the lights.

Fortunately the yellow colour is so apparent that its imperfect elimination is easily detected, and it is not too much to say that by the processes described in this Manual, photographs that will last as long as the material upon which they are made, may be produced, to suit many different purposes, and to meet a great variety of needs.

FORMULÆ.

Sensitizing Solution (p. 11).

(a)	Granulated Bichromate of Potash	.	.	.	.	1 part.
	Water	.	.	.	.	20 parts.
(b)	Commercial Bichromate of Potash	.	.	.	.	1 ounce.
	Liquid Ammonia	.	.	.	.	5 minims.
	Water	.	.	.	.	20 ounces.

Alum Solution (p. 21).

Alum	.	.	.	.	.	1 part.
Water	.	.	.	.	.	30 parts.

Waxing Compound for Pictures Developed on Collodionized Glass (p. 25)

Pure Bees' Wax	.	.	.	.	.	100 grains.
Pure Benzole	.	.	.	.	.	1 pint.

Waxing Compound for Sawyer's Patent Flexible Support (p. 22).

Yellow Resin	.	.	.	.	.	6 drams.
Pure Bees' Wax	.	.	.	.	.	2 drams.
Turpentine	.	.	.	.	.	1 pint.

Solution for Transferring Pictures to Opal (p. 37).

Nelson's Gelatine, No. 1.	.	.	.	.	.	1 ounce.
Water	.	.	.	.	.	9 ounces.
Chrome Alum	.	.	.	.	.	12 grains.
Water	.	.	.	.	.	1 ounce.

Solution for Transferring Pictures to Ivory (p. 37).

Same as above.

Solution for Transferring pictures to Drawing Paper (p. 38).

Nelson's Gelatine, No. 1.	.	.	.	.	.	2 ounces.
Water	.	.	.	.	.	1 pint.
Chrome Alum	.	.	.	.	.	20 grains.
Water	.	.	.	.	.	1 ounce.

Solution for the Transfer of Pictures to Canvas (p. 40).

Same as above.

CONCLUSION.

A PERUSAL of the preceding pages, or even a mere cursory glance at the table of contents, will shew that the Autotype Process furnishes the photographer with the means of producing every class of picture embraced in his repertory; and this by two distinct methods of operation, the direct or indirect, or as they have been called, the Single or Double Transfer Processes.

Reversed Negatives.

For subjects to be reproduced by the Autotype Process of single transfer, or by the Autotype Mechanical Process in permanent pigment in the printing press, reversed negatives are indispensable; many methods of producing these have been suggested, amongst others, transferring the negative film to either collodion or gelatine. This, however, is to some extent a matter involving considerable skill and care, as well as some slight risk, for if the glass plates upon which the negatives are taken have been imperfectly cleaned, or treated with a *substratum*, or even intensified to a very great extent, the film will wholly or partially refuse to leave the glass, and the negative is consequently ruined.

The use of the reversing mirror is simple, it offers very great advantages in certain cases, and the pictures produced by its means are taken with as great rapidity and sharpness as by the ordinary method, whilst the cost of the apparatus is small. There seems to be no possible objection to its use wherever it is desirable to produce permanent photographs.

The Autotype Company have devised an apparatus consisting of a mirror formed by depositing a coating of pure silver upon a surface of plate glass, ground and polished to a perfectly true plane; this mirror is set at an angle of 45° in a well-constructed mahogany box,

which fits on to the front of the camera, and is kept in its position by very simple means. In taking views, portraits, &c., the camera is turned sideways to the object taken, so that the picture falls on the mirror, and the rays of light are reflected from it through the lens and thence to the sensitive surface; in this manner the negative is reversed, and in all other respects it is of a quality quite equal to one taken in the usual manner.

The reversing mirror offers enormous advantages in the copying of engravings, drawings, plans, medallions, and in fact all objects which it is difficult or impossible to place in the usual vertical position, as they simply require to be arranged on the floor, or upon a horizontal board capable of being adjusted to various elevations. The camera is placed in such a position that the mirror looks *down* upon the objects to be taken, which of course keep their position by their own gravity, and the illumination being vertical, there is a remarkable absence of texture or grain, which in the case of drawings, &c., is an immense advantage; whilst for medallions or objects in which strong relief and light and shade is desirable, it is very easy, by covering over the top of the camera and using only a side light, to obtain any amount of relief; the series of negatives (over two hundred in number) taken by the Company, of the celebrated *Utrecht Psalter* at the British Museum, were only possible by reason of the superior advantages in disposition and lighting obtained by the use of the reversing mirror.

By the method of arrangement and fittings adopted by the Autotype Company, the same mirror will answer for all sizes and kinds of lenses, provided of course that it is large enough for the largest lens; in the old form it was deemed necessary to have a separate mirror for each lens, and the method of mounting besides was unnecessarily expensive and allowed all sorts of extraneous rays of light to enter the lens, thus interfering with the definition and vigour of the negative.

Hints on Artistic Finish.

One great advantage possessed by an Autotype over a silver print is the easy manner by which the lights of a picture can be increased or even introduced where wholly wanting. By the use of an ordinary ink eraser heavy shadows can be reduced, want of detail in the half-tones remedied, the high lights invigorated, and a poor flat print, the

offspring of a weak negative, may be converted into an acceptable picture. With enlargements this is invaluable, and with an ink eraser and a little gum to the shadows, an artist-hand makes its influence rapidly apparent.

When any greasiness or other surface difficulty is experienced to the free use of the brush, the whole picture may be rubbed over with a dry hand and finely powdered bath brick. This treatment not only gives the "tooth" required, but in the case of too dark a print will alleviate that defect; the background of a picture may be thus treated to obtain a slight matt effect, often contrasting harmoniously with the figure.

Many artists elect to have Autotypes intended for water-colour, printed in the sepia tissue.

Attention may be directed to the exquisite effect of Autotypes on ivory and on opal finished in monochrome; these surfaces lend themselves readily to delicate shades of effect, and very charming pictures are produced with the smallest expenditure of labour.

For giving a highly polished surface to Autotype prints by mechanical means, either a Weston's rotary burnisher, or a Solomon's hot-plate rolling press may be employed; only it is essential (as recently pointed out by Mr. Valentine Blanchard), that in submitting the prints to the machine they must be thoroughly warmed. The presence of the least humidity in the Autotype would prevent the burnishing.

APPENDIX.

THE AUTOTYPE COMPANY AND ITS PATENTS.

ON the 28th of February, 1878, expired by the effluxion of time, the first of a series of patents which have been acquired from time to time by the Autotype Company, and worked with more or less success.

The patent in question, numbered 503, was sealed to Mr. Swan, June 14th, 1864, being dated February 29th in the same year, and the lapse of this patent sets free:—

- (1) The preparation of coloured gelatinous tissues.
- (2) The production of photographs by what is known as the Single Transfer process.
- (3) The production of photographs by the Double Transfer process—india-rubber paper being used as the Temporary Support.

As far as the photographic profession is concerned, it does not appear that the lapse of this patent by itself can affect them seriously. The difficulties of making tissue are such, that few will succeed in overcoming them by amateur efforts; and it will remain to be proved if, in the eager rush of tissue makers into the field, a better article on the whole can be produced than has been provided hitherto by the Autotype Company.

However this may be, the Company, having done a large foreign trade despite the opposition of native manufacturers, the taxation of customs, and the expenses of carriage, is disposed to view the lapse of the tissue-making patent with equanimity. By the lapse of this patent, the Single Transfer process is now thrown open to the public

but this is useless for negatives taken in the ordinary manner ; and remembering the large and valuable accumulation of negatives in the hands of photographers which cannot be printed by this process ; it will probably be long before any Single Transfer process takes the place of the Double Transfer as now practised.

But a Double Transfer process is open under the new conditions, viz., that with india-rubber paper as the Temporary Support : this was a most ingenious invention of Mr. Swan, and by its means he produced admirable results ; but it is difficult and disagreeable to work, and has been practically superseded by the discovery of Mr. J. R. Johnson, by which Double Transfer is obtained from surfaces impermeable to air and water. Mr. Swan's method with india-rubber paper being wholly abandoned for all practical purposes, it has long ceased to count as an element of value in the patents. The lapse, therefore, of Mr. Swan's patent, although it certainly alters the relations existing between the Autotype Company and the profession generally, inasmuch as it deprives the Company of the command of the manufacture of tissue, does not appear to influence materially, the present modes of producing pictures in permanent pigments, such methods being governed by the patents of Mr. Johnson and Mr. Sawyer respectively.

It has been the practice of the Autotype Company from its very commencement to grant licenses, giving rights to utilize the patents for trade purposes, under certain conditions. The granting of a license necessarily involves conditions, and one of the most important of these has been, that, in addition to the payment of a stated fee, the licensee has been *bound to purchase of the Company, or its agents, all the tissue employed*. Some four hundred licensees have formally accepted these conditions, and until 1884, the Company possesses the legal right to insist on these terms, as the equivalent for the privilege of utilizing the patents.

Whilst the Company held by patent, the monopoly of tissue-making, these conditions were doubtless fair and reasonable ; but under the altered circumstances occasioned by the lapse of Swan's patent, it is quite conceivable that the full assertion of the Company's rights might retard the progress of permanent printing, and place its adherents at a disadvantage.

The interests of Autotype are intimately associated with those of the photographic profession generally ; the production for sale of

carbon tissue is only *one* of the departments of the Company, and by no means the most important. Perhaps the present proprietors of the Company may claim, that, whilst looking after their own interests, and lifting Autotype from a serious loss to a substantial commercial enterprise, they have greatly augmented in other ways the resources of the profession, and elevated photography in public estimation.

With respect to tissue-making, it is probably fortunate for Autotype, that the manufacture of *permanent* pigmented tissues of uniform quality is a difficult matter: the vagaries of the gelatine base; its relation to heat, moisture, ozone, electricity; its peculiar action with many pigments; the chemical conditions involved in its preparation and use, are so intricate, as to render it not unlikely that the knowledge and experience of the Autotype Company *will* count for a good deal in the competition to come.

One thing in the minds of the proprietors of the Company is fixed and certain, and that is, that *they* are not afraid of free trade, and will never consent that the Company should occupy a position in which it shall be possible for any one to tax them with exhibiting a "dog in the manger" policy, by attempting to force on their licensees, materials which they might prefer to purchase in the open market. Therefore, notice is hereby given, that, on and after the 28th of February 1878, the Autotype Company annul that clause in the licenses binding licensees to purchase tissue from the Company, and leave them from that date entirely at liberty to purchase their materials wherever they may please.

The patents at present in the hands of the Company, and which will continue to influence the production of photographs in permanent pigments are as follows:—

Mr. J. R. Johnson's patent, No. 336, February 3rd, 1869.

Mr. J. R. Johnson's patent, No. 201, January 22nd, 1870.

Mr. J. R. Sawyer's patent, No. 3740, October 29th, 1874.

M. Lambert's patent, No. 1634, May 8th, 1874.

M. Lambert's patent, No. 1825, May 17th, 1875.

Of these five patents, one, Mr. Johnson's for improvements in tissue-making, will be retained in the hands of the Company for their own use, and Autotype tissues will continue to be made under that patent with many improvements that long practical experience has been able to suggest.

Chromotype licenses will be granted wherever exclusive rights have not been sold by Lambert, under the following patents:—

Mr. J. R. Johnson's, For Double Transfer from surfaces impermeable
1869,
In force till 1883. to air or fluid.
 (This covers Lambert's method of developing on
 collodionized glass, &c.)

Mr. J. R. Sawyer's, For Double Transfer from a patented Flexible
1874,
In force till 1888. Support, to serve instead of india-rubber paper.
 (An easy and simple means of producing Double
 Transfer prints for transference to paper, ivory,
 opal, canvas, wood, &c.)

And two of For improvements in Photographic Printing
Monsieur Lambert's, Frames and in other apparatus used in connection
1874, 1875. therewith, also improvements in the production of
 enlargements, &c.

The fee for the Chromotype license will be the sum of £20, and will entitle the licensees—

- (1) To the exclusive use of three tissues approved by Lambert, as well as all the other tissues made by the Company.
- (2) To full instruction, at the Autotype Works, in Chromotype printing and the production of enlargements.
- (3) The right to use the Company's registered trade-mark, "Chromotype."
- (4) To a discount of 10 per cent from the market price of the Company's tissues.

Licensees having paid their money will be free to purchase their materials in the open market, and to use and employ the patents for which they have paid, free from all restrictions.

Autotype licenses will be granted under the following:—

Mr. J. R. Johnson's, For Double Transfer from surfaces impermeable
1869, to air or fluid.
In force till 1883.

(This covers entirely the processes now in vogue—collodionized and plain glass, porcelain, opal, metal plates, &c.)

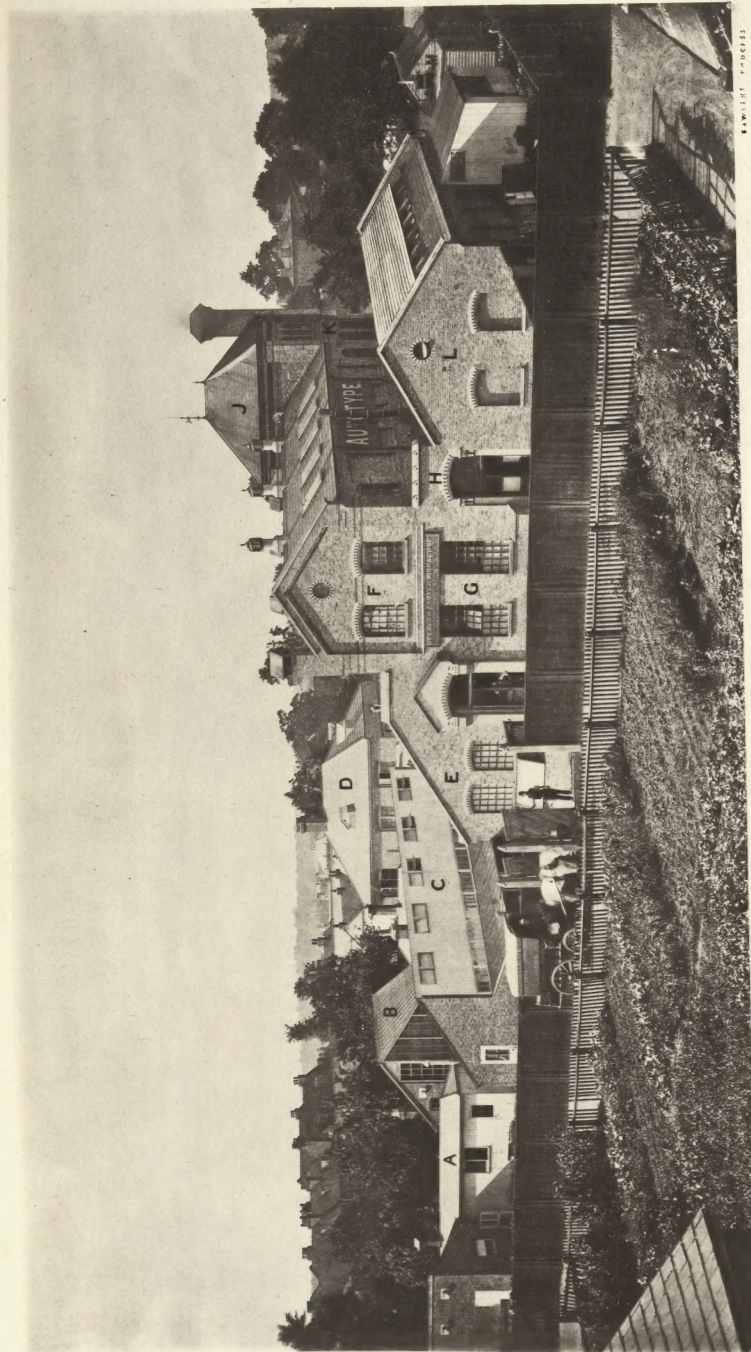
Mr. J. R. Sawyer's, For Double Transfer from a patented Flexible
1874, Support, to serve instead of india-rubber paper.
In force till 1888.

(An easy and simple means of producing Double Transfer prints for transference to paper, ivory, opal, canvas, wood, &c.)

The fee for the Autotype license will continue to be £5 as heretofore, and licensees having paid their money for the license, will be free to purchase their material in the open market, and to use and employ the patents for which they have paid, free from all restrictions.

The Company has recently submitted Mr. Johnson's patent, governing Double Transfer as at present practised, to the most competent legal authorities and have been advised to enter a disclaimer as to certain parts of it. This disclaimer has been before the High Court of Chancery, and a formal judgment has been obtained authorizing the proprietors to disclaim certain portions of the patent which were considered either useless, or such as might become a source of weakness in the event of action being taken to restrain infringements. This patent has now been carefully settled under the advice of Mr. Aston, Q.C., and the Autotype Company has reason to believe that it possesses a perfectly legitimate and strong patent (governing Double Transfer) and will be prepared to maintain its rights if infringed.

With respect to the supply of tissue, it has been the practice hitherto, to limit it to licensees only, but as Single Transfer and Double Transfer, according to Swan's process, have reverted to the public domain, tissue will in the ordinary course of business be supplied to all comers, at their risk in respect to patent rights. For enlargements, reproductions, and copies of works of art, Single Transfer workers have a large field and a legitimate ground for cultivation, quite apart from the delicate Double Transfer process, alone suitable for the production of portraits and small work. The Company will endeavour alike to protect the interests of its licensees, and so to conduct its business operations as to be of benefit to all interested in permanent photographic printing.



PERMANENT ADDRESS

A. ENGRAVING ROOM B. STUDIO D. ENLARGING STUDIOS E. TISSUE ROOM J. STEAM ENGINE & K. COLOR GRINDING ROOM M. GLAZING ROOM.
 C. SOLAR PRINTING HOUSE E. SOLAR DEVELOPING HOUSE G. COUNTING HOUSE H. LABORATORY & L. GALLEY PRESS ROOM.

AUTOTYPE WORKS.

EALING DENE, W. MIDDLESEX.





